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GĀθĀ METER AND METRICAL INDEX

By

I. J. S. TARAPOREWALA

OFFICE OF THE DIRECTOR OF ARCHAEOLOGY
1061
26 AUG 1969
GOVT. OF MADRAS, MADRAS

GĀθĀ METERS

GENERAL PRINCIPLES

It has been known for many years that the Avesta Gāθās are metrical in their structure. Indeed, the very name *Gāθā* implies that they were meant to be sung or chanted. GELDNER in his standard edition of the Avesta Texts has given brief descriptions of the meters of each of the five Gāθās. GELDNER also wrote a work on the metrical system of the Later Avesta, which had remained a standard work for many years. There have also been other studies of Avesta Meters since then, such as the work of J. HERTEL and recently WELLER'S *Anāhitā.* All these deal more with Later Avesta texts. As far as I know the meter of the Gāθās as such has not been treated systematically by any writer.

The Gāθā meters are closely allied to the Vedic meters, as has been recognised by most scholars. There is one essential point of resemblance which has been *mentioned* by almost every scholar, viz., that "the unit of meter is also the unit of sense". But practically no one so far has adhered consistently to this rule while dealing with the Gāθā texts. The majority of scholars jump about from *pāda* to *pāda* in a most distracting manner. Personal study of this question has convinced me that if this dictum is consistently borne in mind much of the Gāθā construction becomes comparatively easy to unravel.

But the first question now would be, "what is 'the unit of meter'?" Is it a *pāda* or a whole line (made up of two *pādas*)? BARTHOLOMÆ has in one place mentioned this rule rather emphatically but immediately after that he proceeds to exemplify this by taking one whole *line* (two *pādas*) as the unit. Nor is he at all consistent throughout his rendering of the Gāθās. The other scholars are equally inconsistent as regards this rule.

I think that the real 'unit of meter', as also the real 'unit of sense' is the *pāda* and not the line, especially where the line (two *pādas*) is of 14 or of 16 syllables. GELDNER has indicated in his Avesta Texts whole lines of the Gāθās, and so also has WESTERGAARD. This was no doubt due to the PAHLAVI commentaries which clearly show an appreciation of the separate lines. Ervad K. E. KANGA was the first, I believe, who attempted to divide the Gāθā verses according to the *pādas*. At present there are two editions of the Gāθās used by Parsi Zoroastrians, in which the verses are shown divided into *pādas*. These are the edition of KANGA, and that of the late BEHRĀMGORE T. ANKLESARIA. But they both

merely take whole lines as given by GELDNER and divide the lines into two more or less equal parts without any regard to the 'unit of sense'. Such purely mechanical division can hardly be called satisfactory.

In counting the syllables of these Gāθā verses one has to remember that the strict rules of classical Sanskrit meters do not apply to Avesta. Especially the fixed position of long and short syllables to which one is accustomed in classical Sanskrit cannot be applied to Avesta verse. We have merely to *count* the number of syllables without any regard to their length. There is also another and very important caution to be remembered. We must never forget that a lot of extra vowels get added at the beginning and often in the middle of words. These are the prothetic, epenthetic and other vowels so often found in Avesta words. For the purpose of scanning these vowels are to be discarded utterly. Then again there are a lot of peculiar 'diphthongs' developed in accordance with the special phonetic laws of Iranian languages. In the majority of cases these diphthongs count as monosyllables, but sometimes meter requires that these be resolved into their components. There are also certain words where this resolution of diphthongs is invariably observed, e.g., *Da-ē-nā* is always trisyllabic. Certain words have an extra vowel inserted for the purpose of scanning. Thus *Ārmaiti* is always scanned as if it were *Ā-ra-mai-ti* (four syllables). Similarly *mōi*, when it is not the enclitic pronoun, but is an emphatic particle, is always disyllabic *mō-i*. The rules of *sandhi*, as usually followed in Sanskrit are generally not observed in Avesta. Still, sometimes the final vowel of a word has to be combined with the initial vowel of the following word in order to get the meter correct. All these little points have to be carefully observed. A fairly safe 'rule of thumb' is to put the Avesta word into its corresponding Sanskrit form and then to scan that.

THE THREE HOLY CHANTS

I have given these at the beginning of this my edition of the Gāθās, first of all because the ideas contained in them are a sort of epitome of the Teaching of the Gāθās. Another reason is that these three verses occur respectively as verses 13, 14 and 15 of the 27th Hā (section) of the Yasna, and as such they immediately precede the Gāθās which begin with Hā 28.

Of these *Ahuna-Vairya* (Yas. 27.13) is in fact the very foundation verse of the first Gāθā, and, indeed, the very name of the first Gāθā is, I believe, reminiscent of this verse. Moreover, the language and meter of this verse is identical with that of the Gāθā Ahunavaiti. It consists of three lines, each of two *pādas*, arranged 7–9; 7–9; 7–9.

Ašəm vohū (Yas. 27.14) is a somewhat later composition. I scan it as made up of two lines of twelve syllables each (*jagatī*) with a cesura

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after the fourth syllable. GELDNER and others, however, print it as three lines of eight syllables each.

Yeṅhe hātąm (Yas. 27.15) is decidedly a later composition. Its meter is somewhat irregular. It can be divided into four lines of 9–9–8–8 syllables each. This arrangement is of course irregular and does not correspond to any scheme of Gāθā versification. And it seems to be a later paraphrase of the last verse of Gāθā Vohū-Xšaθra (Yas. 51.22).

THE 'INTRODUCTORY' VERSE

This has been numbered Yas. 28.0 by GELDNER. GELDNER seems to regard it as 'rhythmic prose', but it can easily be resolved into four lines of 12–8; 12–8 syllables.

GĀθĀ AHUNAVAITI

This Gāθā is the first, the most important, as well as the longest of all the five. It extends from Yasna Hā 28 to Hā 34. It has 100 verses. GELDNER prints each verse as made up of three lines. Each line can be taken as corresponding to a line of the Sanskrit *anuṣṭup* (of 16 syllables). And each line can be divided into two *pādas*. But these divisions are not always equal as in Sanskrit. They may be divided 7–9, or 8–8, or 9–7. Why such variations exist is difficult to explain, but I suspect that the accent of Avesta words (which is usually a strong *stress* on the penultimate syllable) is responsible for these.

Thus each verse of the Ahunavaiti Gāθā can be arranged as consisting of six *pādas*. And if we follow the *sense*, these six can be arranged either (i) as three couplets or (ii) as two triplets, in other words, as one verse and a half of *anuṣṭup* or as two *gāyatrī* * verses. But *metrically* the verses are always to be considered as being arranged in three couplets. Thus if the six *pādas* are 7–9, 7–9, 7–9 then the sense might permit them to be arranged as three couplets or as two triplets (7–9–7, 9–7–9). This last arrangement (two *gāyatrī* verses) is found in 43 out of the 100 verses of the Ahunavaiti Gāθā.

It may also be noted in passing that when two or more consecutive verses show this arrangement of 'two *gāyatrīs*', the thought also tends to be continuous.

Out of 300 lines of 16 syllables each (making up the 100 verses of this Gāθā) the vast majority can be divided as 7-9. Out of the 300 lines 258 show this type of division. Of the remaining 42 lines, 20 show the type 8–8 and 21 show 9–7; and only one line (Yas. 32.13.a) is entirely irregular, the *pādas* being 8–9, thus causing this line to consist of 17 syllables. This is the only irregular line in the whole of the Gāθā Ahunavaiti.

---

* Note that the Sanskrit names are for convenience, and they do *not* imply that the Avesta meters are identical.

In the following Tables each verse of the Ahunavaiti taken Hā by Hā has been analysed :

Yas. 28	a	b	c	d	e	f	
1			9	7			G
2							
3							G
4			9	7			
5			9	7			
6							G
7							
8							G
9							G
10	8	8			9	7	G
11							

(N.B.—In these tables the usual 7–9 lines are not indicated.
G indicates 'two *gāyatrīs*'.)

Analysis :

'Two *gāyatrīs*', 6 verses (1, 3, 6, 8, 9, 10).
Total number of lines, 33.
7–9 lines, 28.
8–8 ,, 1 (10 a b).
9–7 ,, 4 (1 c d, 4 c d, 5 c d, 10 e f).

Yas. 29	a	b	c	d	e	f	
1							
2	9	7					
3							
4							G
5							
6	9	7					
7	9	7					
8							G
9							
10							
11	9	7					

Analysis :

'Two *gāyatrīs*', 2 verses (4, 8).
Total number of lines, 33.
7–9 lines, 29.
8–8 ,, nil.
9–7 ,, 4 (2 a b, 6 a b, 7 a b. 11 a b).

Yas. 30	a	b	c	d	e	f	
1							
2							
3			8	8	9	7	
4							G
5	8	8					G
6	9	7					G
7							
8	9	7					
9							G
10							G
11							G

Analysis :

'Two *gāyatrīs*', 6 verses (4, 5, 6, 9, 10, 11).
Total number of lines, 33.
7–9 lines, 28
8–8 ,, 2 (3 c d, 5 a b).
9–7 ,, 3 (3 e f, 6 a b, 8 a b).

Yas. 31	a	b	c	d	e	f	
1							
2							
3							G
4	9	7					G
5			8	8			
6							
7							
8							G
9							G
10	8	8					
11							G
12					9	7	G
13							
14							
15							G
16							
17							G
18							
19							
20							
21							G
22							

Analysis :

'Two *gāyatrīs*', 9 verses (3, 4, 8, 9, 11, 12, 15, 17, 21).
Total number of lines, 66.
7–9 lines, 62.
8–8 ,, 2 (5 c d, 10 a b).
9–7 ,, 2 (4 a b, 12 e f).

Yas. 32	a	b	c	d	e	f	
1			9	7			
2			8	8	9	7	G
3	8	8					G
4	8	8	8	8	9	7	G
5							
6			8	8			
7							
8			9	7			
9					8	8	
10							G
11							G
12							G
13	8	9*					G
14							G
15					8	8	
16							

Analysis :

'Two *gāyatrīs*', 8 verses (2, 3, 4, 10, 11, 12, 13, 14).
Total number of lines, 48.
7–9 lines, 36.
8–8 ,, 7 (2 c d, 3 a b, 4 a b, c d, 6 c d, 9 e f, 15 e f).
9–7 ,, 4 (1 c d, 2 e f, 4 e f, 8 c d).
8–9* ,, 1 (13 a b).

* This is the only line of 17 syllables in the Ahunavaiti.

Yas. 33	a	b	c	d	e	f	
1					9	7	
2							G
3							G
4							
5			8	8			
6					9	7	G
7							G
8	8	8					
9							G
10							G
11							
12							
13	8	8	8	8			
14							

Analysis :

'Two *gāyatrīs*', 6 verses (2, 3, 6, 7, 9, 10).
Total number of lines, 42.
7–9 lines, 36.
8–8 ,, 4 (5 c d, 8 a b, 13 a b, c d).
9–7 ,, 2 (1 e f, 6 e f).

Yas. 34	a	b	c	d	e	f	
1	8	8					
2							
3							
4							
5							G
6							
7			9	7	9	7	
8							G
9			8	8			
10	9	7					
11							G
12							G
13							G
14					8	8	G
15							

Analysis :

'Two *gāyatrīs*', 6 verses (5, 8, 11, 12, 13, 14).
Total number of lines, 45.
7–9 lines, 39.
8–8 ,, 3 (1 a b, 9 c d, 14 e f).
9–7 ,, 3 (7 c d, e f, 10 a b).

Summary of Analysis of Gāθā Ahunavaiti :

			Lines						
Yasna	Verses	Pādas	7–9	8–9	9–7	8–9	Total	Two *gāyatrīs*	Remarks
28	11	66	28	1	4		33	6 verses	
29	11	66	29	nil	4		33	2 verses	
30	11	66	28	2	3		33	6 verses	
31	22	132	62	2	2		66	9 verses	
32	16	96	36	7	4	1*	48	8 verses	* This is the only line with 17 syllables.
33	14	84	36	4	2		42	6 verses	
34	15	90	39	3	3		45	6 verses	
Total	100	600	257	20	22	1	300	43 verses	

GAθA UŠTAVAITI

The second Gāθā, Uštavaiti, covers Yasna Hās 43, 44, 45 and 46 and consists of 66 verses in all. Each of these verses is made up of five lines, usually in the *tristup* meter (11 syllables each line). The only exception is verse Yas. 46.15 which is found in all mss. to have only four lines instead of five. I have ventured to supply this missing line (the 2nd); but evidently this lack of one line has not been serious enough to affect the sense of the whole verse. From the days of the Pah. writers this verse has had only four lines. Some of the earlier scholars have also attempted to restore this missing line.

There are occasional variations found in the lines. We get occasional lines in the *jagatī* measure (12 syllables) and these vary the monotony of the 11-syllabled lines just as we find in the Vedas. Out of the total of 330 lines (including the missing one restored by me) no less than 312 are *tristup* and only 18 are *jagatī*. In both these varieties the cesura is usually found after the *fourth* syllable. Here also we get occasionally, by way of variation, the cesura after the *fifth* syllable. There are only eight such lines. It may also be noted that in one verse (Yas. 44.18) there are two such lines with the cesura after the fifth syllable.

The five lines of each verse can be grouped according to sense either as 2–3 or as 3–2. This grouping seems to be nearly equally divided; out of the 66 verses 34 show the 2–3 arrangement and 32 are arranged as 3–2.

The following tables show the analysis of each verse of the Gāθā Uštavaiti, taken Hā by Hā :

Yas. 43	a	b	c	d	e
1			12		2–3
2					
3					
4					
5					2–3
6					
7					2–3
8					
9			12		2–3
10				12	2–3
11					
12					2–3
13					2–3
14				12	
15					
16					2–3

(N.B.—Lines with 12 syllables alone are indicated and those with cesura after the fifth syllable are denoted by an asterisk (*). Verses with the 2–3 arrangement are also indicated.)

Analysis :

Total number of lines, 80.
tristup lines, cesura after 4th, 76.
,, ,, ,, ,, 5th, nil.
jagatī lines, cesura after 4th, 4 (1 c, 9 c, 10 d, 14 d).
,, lines, cesura after 5th, nil.
2–3 arrangement in 8 verses (1, 5, 7, 9, 10, 12, 13, 16).

Yas. 44	a	b	c	d	e	
1						2–3
2					12	
3						2–3
4				12		
5						
6						2–3
7			*12			
8					12	2–3
9						
10			*12			
11						
12						
13						2–3
14						2–3
15						2–3
16						2–3
17		12				
18				*12	*	
19						
20						2–3

Analysis :

Total number of lines, 100.
triṣṭup lines, cesura after 4th, 92.
,, ,, ,, ,, 5th, 1 (18 e).
jagatī ,, ,, ,, 4th, 4 (2 e, 4 d, 8 e, 17 b).
,, ,, ,, ,, 5th, 3 (7 c, 10 c, 18 d).
2–3 arrangement in 9 verses (1, 3, 6, 8, 13, 14, 15, 16, 20).
One verse with *two* lines having cesura after 5th (18 d, e).

Yas. 45	a	b	c	d	e	
1						
2						2–3
3						2–3
4						
5						2–3
6						2–3
7						2–3
8						2–3
9						2–3
10						2–3
11					*12	

Analysis :

Total number of lines, 55.
triṣṭup lines, cesura after 4th, 54.
,, ,, ,, ,, 5th, nil.
jagatī ,, ,, ,, 4th, nil.
,, ,, ,, ,, 5th, 1 (11 e).
2–3 arrangement in 8 verses (2, 3, 5, 6, 7, 8, 9, 10).

Yas. 46	a	b	c	d	e
1					2–3
2					2–3
3					
4			*12		
5					
6					2–3
7					
8	12				
9					
10	12				
11					2–3
12		*12			
13					2–3
14					2–3
15		†			
16					12 2–3
17					2–3
18					
19	*12				2–3

Analysis :

Total number of lines, 94 + 1†.
triṣṭup lines, cesura after 4th, 88 + 1†.
,, ,, ,, ,, 5th, nil.
jagatī ,, ,, ,, 4th, 3 (8 a, 10 a, 16 e).
,, ,, ,, ,, 5th, 3 (4 c, 12 b, 19 a).
2–3 arrangement in 9 verses (1, 2, 6, 11, 13, 14, 16, 17, 19).

†This line (15 b) has been added by me.

Summary of Analysis of Gāθā Uštavaiti :

			Cesura after 4th		Cesura after 5th			
Yasna	Verses	Lines	*triṣṭup*	*jagatī*	*triṣṭup*	*jagatī*	2–3 : 3–2	Remarks
43	16	80	76	4	nil	nil	8 : 8	
44	20	100	92	4	1	3	9 : 11	
45	11	55	54	nil	nil	1	8 : 3	
46	19	94 + 1†	88 + 1†	3	nil	3	9 : 10	†This line has been added by me.
Total	66	329 + 1†	310 + 1†	11	1	7	34 : 32	

GĀθĀ SPƏNTĀ-MAINYŪ

Spəṇtā-Mainyū Gāθā covers Hās 47, 48, 49 and 50 and consists of 41 verses of four *triṣṭup* lines each. Hence its metrical scheme comes nearest to that of the Vedic *triṣṭup*. There are thus 164 lines in all. The four lines in each verse are usually arranged as 2–2 (following the sense). But in three verses (Yas. 48.1, 7 and 49.10) the arrangement seems to be 1–2–1, in other words, the second and the third lines seem to be joined together as a couplet. As in Uštavaiti there are occasional *jagatī* lines. The cesura is usually after the *fourth* syllable, but occasional variations are also found, the cesura coming after the *fifth* syllable (both in *triṣṭup* and in *jagatī*).

A remarkable group of verses are Yas. 48.5–7. All the four lines of verse 5 are *jagatī* with cesura after the fifth syllable. In verse 6 three lines out of the four have the cesura after the fifth, but only one line of these three *jagatī*. And in verse 7 only one line out of the four has the cesura after the fifth, and that line is *triṣṭup*. Thus out of the twelve lines making up these three verses no less than eight have the cesura after the fifth, and five lines out of these eight are *jagatī*, and three are *triṣṭup*.

The last two Hās of this Gāθā (Yas. 49 and 50), 92 lines in all, do not show a single line of *jagatī*, and there is but one line (a *triṣṭup*) which has the cesura after the fifth.

The following tables show the analysis of each verse of this Gāθā Hā by Hā :

Yas. 47	a	b	c	d	
1					
2					
3					
4					
5					
6					

(N.B.—Only the *jagatī* lines are indicated, and those with cesura after the 5th syllable are indicated by an asterisk (*). The verses with arrangement of lines other than 2–2 are also indicated.)

Analysis :

Total number of lines, 24.

All the lines are *triṣṭup* with cesura after 4th.

Yas. 48	a	b	c	d	
1		*12			1–2–1
2					
3					
4					
5	*12	*12	*12	*12	
6	*		*12	*	
7	*				1–2–1
8					
9	12				
10					
11					
12					

Analysis :

Total number of lines, 48.

triṣṭup lines, cesura after 4th, 38.

,, ,, ,, ,, 5th, 3 (6 a, d, 7 a).

jagatī ,, ,, ,, 4th, 1 (9 a).

,, ,, ,, ,, 5th, 6 (1 b, 5 a, b, c, d, 6 c).

1–2–1 arrangement in two verses (1, 7).

In verse 5 all the four lines are *jagatī* with cesura after 5th.

In verse 6 three lines (a, c, d) have cesura after 5th.

Yas. 49	a	b	c	d	
1					
2					
3			*		
4					
5					
6					
7					
8					
9					
10					1–2–1
11					
12					

Analysis :

Total number of lines, 48.
triṣṭup lines, cesura after 4th, 47.
,, ,, ,, ,, 5th, 1 (3 c).
There are no *jagatī* lines.
1–2–1 arrangement in one verse (10).

Yas. 50	a	b	c	d
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

Analysis :

Total number of lines, 44.
All lines are *triṣṭup*, cesura after 4th.

Summary of Analysis of Gāθā Spəṇtā-Mainyū :

Yasna	Verses	Lines	Cesura after 4th: *triṣṭup*	Cesura after 4th: *jagatī*	Cesura after 5th: *triṣṭup*	Cesura after 5th: *jagatī*	1–2–1	
47	6	24	24	nil	nil	nil	nil	All lines are *triṣṭup*, cesura after 4th.
48	12	48	38	1	3	6	2	In verse 5 all four lines are *jagatī* with cesura after 5th. In verse 6 three lines (a, c, d) have cesura after 5th and one line (c) is *jagatī*.
49	12	48	47	nil	1	nil	nil	There are no *jagatī* lines.
50	11	44	44	nil	nil	nil	1	All lines are *triṣṭup*, cesura after 4th.
Total	41	164	153	1	4	6	3	

GĀθĀ VOHŪ-XŠAθRA

The Gāθā covers only one Hā (Yas. 51) and consists of 22 verses. Each verse is divided into six *pādas*. Thus there are 132 *pādas* in all, and each *pāda* has 7 syllables. The six *pādas* are arranged either as three couplets (2–2–2) or as two triplets (3–3). Fifteen verses are of the first variety and the remaining seven of the second. There is one special peculiarity in seven *pādas* of this Gāθā. They are 'catalectic', i.e., though actually consisting of eight syllables, they are to be scanned as if they had only seven. This is achieved by syncopation of one of the vowels, through vowel-*sandhi*.

The following table shows the analysis of this Gāθā :

Yas. 51	a	b	c	d	e	f	
1							
2							3–3
3							
4	C						
5							
6						C	3–3
7							
8							
9							
10							
11							
12							3–3
13							
14		C					3–3
15							
16							3–3
17							3–3
18					C		
19				C			3–3
20							
21						C	3–3
22	C						3–3

Analysis :

(N.B.—C indicates 'catalectic' *pādas*.)

Total number of verses, 22.
Total number of *pādas*, 132.
Catalectic *pādas*, 7 (4 a, 6 f, 14 b, 18 e, 19 d, 21 f, 22 a).
3–3 arrangement in 9 verses (2, 6. 12, 14, 16, 17, 19, 21, 22).

GĀθĀ VAHIŠTĀ-ĪŠTI AND AIRYƏMĀ-IŠYŌ

Gāθā Vahištā-īšti and Airyəmā-išyō have to be considered together for the purpose of meter. In fact I regard Airyəmā-išyō (Yas. 54) to be a continuation of the Fifth Gāθā because both these resemble each other not merely in meter but also in language and in subject-matter. The meter is somewhat complex. There are ten verses

in all—nine for Yas. 53 and one for Yas. 54.* Each verse can be divided into six lines, of which three are long and three are short. The long lines are always of twelve syllables. Though this length is the same as that of the *jagatī* (as found in Uštavaiti and Spəṇtā-Mainyū), still there is no indication of a cesura anywhere.

The first two lines in each verse are always long; and, with only one exception (Yas. 53.5), the last line is also long. In Yas. 53.5 the last line is short, of eight syllables.

The three short lines in each verse total altogether 24 syllables. In six out of the ten verses (1, 2, 3, 4, 6, 7) these three short lines occur consecutively, and one of these is always of eight syllables, the remaining two making up 16 syllables between them. These remaining two short lines are arranged either as 7–9, or 8–8, or 9–7 (as in Ahunavaiti). The two short lines are 7–9 in three verses (Yas. 53.5, 6, 8); they are 8–8 in two verses (Yas. 53.1, 3); and they are 9–7 in three verses (Yas. 53.2, 4, 7).

In the majority of the verses of Vahištā-īšti (Yas. 53)—in six out of nine verses (viz., 1, 2, 3, 4, 6 and 7)—the arrangement of the lines is: two long-three short-one long. In the 5th verse the arrangement is: two long-two short-one long-one short. In the remaining verses of Vahištā-išti (8 and 9) and in Airyəmā-išyo, however, there are *four* long lines and only *two* short ones. And the arrangement in these is also different. In Yas. 53.8 the scheme is: two long-two short-two long, and the two short lines are 7–9, thus making up 16 syllables in all. In Yas. 53.9 and in Airyəmā-išyō the scheme is: two long-one short-one long-one short-one long. In both these verses the two short lines are separated by a long line and hence each is of eight syllables, again making the total of 16 syllables for the two.

These six lines of each verse are arranged (following the sense) either as three couplets or as two triplets. Six verses of Yas. 53 (1, 2, 3, 5, 8, 9) have the first type of arrangement. The remaining verses of Yas. 53 (viz., 4, 6, 7) and Airyəmā-išyō are arranged as two triplets.

There is yet another peculiarity of the Fifth Gāθā. In it we find a good many words which are evidently later interpolations. These always spoil the meter, and often they make hardly any sense. By most scholars they are regarded as untranslatable. As in the other Gāθās there are also a number of particles etc. which have to be omitted for metrical reasons. The main interpolations are:

* In Yas. 54 the second 'verse', as given in Geld.'s Text is only a ritualistic formula in prose.

in Yas. 53.3 d the words *taibyō dāt* ;
in Yas. 53.4 d the words *mām bāədus̆* ;
in Yas. 53.6 c the words *Drujō* and *hōiš piθā* ;
in Yas. 53.6 e the word *drəgvōdəbyō* ; and
in Yas. 53.8 c the words *xrūnərąm-cā.*

The following table shows the analysis of Yas. 53 and of 54.1 :

Yas. 53	a	b	c	d	e	f	
1	12	12	8	8	8	12	
2	12	12	9	7	8	12	
3	12	12	8	8	8	12	
4	12	12	8	9	7	12	3-3
5	12	12	7	9	12	8	
6	12	12	7	9	8	12	3-3
7	12	12	8	9	7	12	3-3
8	12	12	7	9	*12	12	
9	12	12	8	*12	8	12	
Yas. 54							
1	12	12	8	*12	8	12	3-3

Analysis :

(* indicates the fourth long line.)

Total number of lines, 60.
Last line short, 5 f.
Short lines paired 7-9 (5cd, 6cd, 8cd).
,, ,, ,, 8-8 (1cd, 3cd).
,, ,, ,, 9-7 (2cd, 4 de, 7de).

3-3 arrangement in 4 verses (Yas. 53.4, 6, 7 and Yas. 54.1).

Four long lines, in 3 verses (Yas. 53.8, 9 and Yas. 54.1).

METRICAL INDEX

Introductory Note

1. This Metrical Index gives every line and *pāda* found in the verses of the Five Gāθās as well as in the Ahuna-Vairya, the Ašəm Vohū, the Yeŋ́he hātąm and the Airyəmā Išyō.

2. The Index has been arranged alphabetically, according to the first letter of the line or the *pāda*. The following is the order of letters: (Vowels) a, ə; ā, ə̄, å, ą̄; i, ī; u, ū; ərə; e, ē; o, ō; (Velers) k, x, g, γ, ŋ; (Palatals) c, j, ŋ́; (Dentals) t, ṯ, θ, d, n, ṉ; (Labials) p, f, b, w, m; (Semi-vowels) y, r, v; (Spirants) š, ž, s, z; (Aspirate) h; (Conjuncts) x', x^{v}.

3. The syllables of each word are separated by a hyphen (-); vowels to be elided are indicated by an apostrophe (').

4. Prothetic, epenthetic and other vowels to be omitted in the scanning are enclosed within ordinary brackets ( ).

5. A syllable to be 'prolonged', or 'syncopated', or otherwise changed, is shown in that form and the form found in the Text is also shown enclosed in 'angular brackets' < >.

6. Words and syllables occurring in Geldner's Text, but which have to be omitted is the scansion are enclosed in 'square brackets' [ ].

7. Words introduced by me, but not found in Geldner's Text, are enclosed in 'braces' { }.

8. Words marked with a preceding $^{+}$ mean that there is a different reading in Geldner's Edition.

[For words mentioned in 6–8 above see also under 'Variants' (Appendix 3) in this book.]

9. In lines of 11 syllables (*triṣṭup*) or of 12 syllables (*jagatī*) there is as a rule a cesura after the *fourth* syllable; this is indicated by an oblique line / . But sometimes the cesura comes after the *fifth* syllable, in which case this oblique line is doubled / / . In Yas. 53 and 54, however, this cesura is not apparent in the longer lines of 12 syllables; and so it is not indicated there.

10. In Yasna 51 most of the *pādas* are of 7 syllables. But in a few cases the *pādas* have actually 8 syllables each; still they are to be scanned as if they had only 7 syllables, one syllable being 'syncopated'. Such *pādas* are called 'catalectic', and these are indicated by being put between asterisks * *.

11. At the end of each line or *pāda* properly scanned the number of syllables it contains is given in brackets together with the reference giving the *Hā*, the verse, and the line (or *pāda*).

a

a(i)-bī ˹A-šā˺ vaē-na-hī vīs-pā (9 : 31.13.f).
a(i)-bī θwā-hū / ga-ē-θā-hū ⁺ta-nuš-cā (11 : 43.7.e).
a(i)-bi-dərəš-tā / ā-vi-ši-ā <-šyā> a-vaŋ-hā (11 : 50.5.c).
⁺A(i)r-yam-nas-cā na-dən̲-tō (7 : 33.4.e).
A(i)r-yam-nā vā A-hu-rā (7 : 33.3.c).
aē(i)-byō aŋ-hə̄uš / a-vōi aŋ-hat̲ ⁺a-pə-məm (11 : 45.3.e).
aē(i)-byō dū-i-rē Vo-hū [as] Ma-nō (9 : 34.8.f).
aē(i)-byō pərə-nā ā-pa-nāiš-kā-məm (9 : 28.10.d).
aē(i)-byō maš A-šā syaz-dat̲ (7 : 34.9.e).
aē(i)-byō Maz-dā̊' <-dā̊ a> -kā mra-ot̲ (7 : 32.12.e).
aē(i)-byō Maz-dā̊ A-hu-rō (7 : 32.2.a).
aē(i)-byō yōi (u)rvā-tāiš Dru-jō (7 : 31.1.c).
aē(i)-byō ⁺Ra-tuš / sə̄n̲g-ha(i)-ti Ā-ra <Ār> -ma(i)-tiš (11 : 43.6.d).
aē(i)-byō raf(ə)-δrāi / Maz-dā̊ sas-tē A-hu-rō (11 : 46.12.e).
aē(i)-byō sas-tē A-hu-rā (7 : 30.8.e).
aēm Mōi i-dā vis-tō (7 : 29.8.a).
a-ē-ša-sā ⁺jīt̲-⁺ar(ə)-tā pə-šō-ta-nu-ō <-nvō> (12 : 53.9.b).
aē-ša-ą̄m <-šą̄m> aē-naŋ-ha-ą̄m <-hą̄m> (7 : 32.7.a).
„ „ „ „ „ (7 : 32.8.a).
aē-ša-ą̄m <-šą̄m> -cīt̲ ā ah-mī (7 : 32.8.e).
Aē-ša-ą̄m <-šą̄m> Tōi A-hu-rā (7 : 34.1.e).
Aē-ša-ą̄m <-šą̄m> Tōi ā aŋ-hat̲ (7 : 30.7.e).
ao-gō dā-tā A-šā Xša-θrəm-cā (9 : 29.10.b).
ao-jōŋh-van̲-təm A-šā us(ə)-ma-hī (9 : 34.4.b).
ao-dərəš-cā zōi-š(ə)nū vā-zā (7 : 51.12.f).
a-kəm a-kāi / vaŋ-hvīm <vaŋuhīm> a-šīm vaŋ-haō-vē (11 : 43.5 d).
a-kəm-cā ma-nō ya-zāi a-pā (9 : 33.4.b).
a-kā var(a)-nā / drəg-vā̊ ⁺hiz-vā ā-vərə-tō (11 : 45.1.e).
a-kā ⁺šyao-θnəm va-caŋ-hā (7 : 32.5.e).
a-kāiš ⁺šyao-θnāiš / a-hūm mərən̲-gə(i)-dyāi ma-šīm (11 : 46.11.b).
a-kāiš xᵛar(ə)-θāiš / pa(i)-ti Ur-vā-nō ⁺ye(i)n̲-tī (11 : 49.11.c).
A-kāt̲ Ma-naŋ-hō stā ci-θrəm (8 : 32.3.b).
a-guš-tā va-cā̊ sə̄n̲g-hā-ma-hī (9 : 31.1.b).
<aŋuhīš> aŋ-hvīš -cā aŋ-hu-as <-hvas> -cā (7 : 32.11.c).
aŋ-hə̄uš A-hu-rəm šyao-θa-naē-šū (9 : 31.8.f).
aŋ-hə̄uš dar(ə)-θrāi / frō A-ša-hyā frā-rən̲-tē (11 : 46.3.b).
aŋ-hə̄uš mar(a)x-tā-rō a-hyā (7 : 32.13.c).
A-ciš-ta-hyā d(ə)mā-nē Ma-naŋ-hō (9 : 32.13.b).
a-ciš-tō drəg-va-ta-ą̄m <-tą̄m> (7 : 30.4.e).
a-cis-tā Ma-gāi ərə-švō (7 : 51.11.f).
at̲ a(i)-pī tāiš aŋ-ha(i)-tī uš-tā (9 : 30.11.f).
at̲ ⁺Aēš-məm ⁺hən̲-⁺dvā-rən̲-tā (7 : 30.6.e).
at̲ a-šāu-nē / raf(ə)-nō x'i-yə̄m <x'yə̄m> ao-jōŋh-vat̲ (11 : 43.8.c).

at̲ a-šāu-nē Va-hiš-təm Ma-nō (9 : 30.4.f).
at̲ ⁺a-sīš-tā yao-jan̲-tē (7 : 30.10.c).
at̲ A-hu-rā / hvō Ma(i)n-yūm Za-ra-θuš-trō (11 : 43.16.a).
at̲ ah-māi a-kāt̲ a-šyō (7 : 51.6.d).
at̲ a-hyā mā / bən̲-dva-hyā mā-na-ye(i)-tī (11 : 49.2.a).
at̲ a-x́yāi A-šā / / Maz-då ur-va-rå vax-šat̲ (12 : 48.6.c).
at̲ ə̄ vao-cat̲ A-hu-rō Maz-då (9 : 29.6.a). 50
at̲ īt̲ pərə-sā / yōi ⁺piš-ye(i)n̲-tē aē(i)-byō kąm (11 : 44.20.b).
at̲ īš Vohū / həm a(i)-bi-mōist Ma-naŋ-hā (11 : 46.12.d).
at̲ kəhr-pəm u-ta-yū(i)-tīš (7 : 30.7.c).
at̲-cā ah-māi / var(ə)-nāi Maz-dā ni-dā-təm (11 : 49.3.a).
at̲-cā ah-māi / vīs-pa-na-ām < -nąm > va-hiš-təm (11 : 43.2.a).
at̲-cā ī Tōi ma-naŋ-hā (7 : 34.2.a).
at̲-cā ⁺Gəuš-⁺Ūr-vā raos-tā (7 : 29.9.a).
at̲-cā Tōi va-ēm x́yā-mā (7 : 30.9.a).
at̲-cā ya-dā aē-ša-ąm < -šąm > kaē-nā (9 : 30.8.a).
at̲-cā və̄ mīž-dəm aŋ-hat̲ a-hyā Ma-ga-hyā (12 : 53.7.a). 60
at̲-cā [Hōi] scan̲-tū ma-naŋ-hā ux-δāiš ⁺šyao-θnāiš-cā (12 : 53.2.a).
at̲-cā hyat̲ tā həm Ma(i)n-yū (7 : 30.4.a).
at̲-cit̲ aē(i)-byō va-hištā (7 : 31.1.e).
at̲-cīt̲ ah-māi / Maz-dā A-šā aŋ-ha(i)-ti (11 : 50.3.a).
at̲ tat̲ mōi daxš-təm dā-tā (7 : 34.6.c).
at̲ tā Ma(i)n-yū pou-ru-yē (7 : 30.3.a).
at̲ tā vax-šyā i-šən̲-tō (7 : 30.1.a).
at̲ tən̲g drəg-vå / yən̲g A-ša-hyā vaz-drən̲g pāt̲ (11 : 46.4.a).
at̲ Tū mā dāiš / A-šəm hyat̲ mā zao-zao-mī (11 : 43.10.a).
at̲ Tū mōi nōit̲ / a-sruš-tā ⁺pa(i)-rī-⁺aoɣ-žā (11 : 43.12.b). 70
at̲ tōi aŋ-hən / Sao-šyan̲-tō da-x́yu-na-ąm < -nąm > (11 : 48.12.a.)
at̲ Tōi Ā-trəm A-hu-rā (7 : 34.4.a).
at̲ Tōi u-bē Haur-vås-cā (7 : 34.11.a).
at̲ Tōi Maz-dā ⁺tə̄ ⁺Ma(i)n-yū (7 : 33.9.a).
at̲ Tōi mīž-dəm A-hu-rā (7 : 34.3.a).
at̲ tōi vīspən̲g / an̲g-rən̲g a-šāu-nō ā-dar(ə) (11 : 43.15.e).
at̲ Tōi sa-vāiš / vah-məm vax-šat̲ A-hu-rā (11 : 48.1.d).
at̲ Θwā mən̲g-hāi / Tax-məm-cā Spən̲-təm Maz-dā (11 : 43.4.a).
at̲ duš-xša-θrən̲g / duš-⁺šyao-θnən̲g duž-va-caŋ-hō (11 : 49.11.a).
at̲ nə̄ Ašā / fri-yā < fryā > daz-dyāi hā-kur(ə)-nā (11 : 44.1.d). 80
at̲ fra-vax-šyā / aŋ-həuš a-hyā Po-ur-vīm (11 : 45.3.a).
at̲ fra-vax-šyā / aŋ-həuš a-hyā Va-hiš-təm (11 : 45.4.a).
at̲ fra-vax-šyā / aŋ-həuš Ma(i)n-yū pou-ru-yē (11 : 45.2.a).
at̲ fra-vax-šyā / nū gū-šō-dūm nū srao-tā (11 : 45.1.a).
at̲ fra-vax-šyā / vīs-pa-na-ām < -nąm > Ma-ziš-təm (11 : 45.6.a).
at̲ fra-vax-šyā / hyat̲ mōi mraot̲ Spən̲-tō-tə-mō (11 : 45.5.a).
at̲ Maz-dā ⁺taē(i)-byō Xša-θrəm (7 : 30.8.c).

at̲ Maz-dā da(i)-biš-yan̲-tē (7 : 34.4.e).

at̲ mā ya-va / bə̄n̲-dvō pa-frē ma-ziš-tō (11 : 49.1.a).

at̲ yas-təm nōit̲ / nā i-sə-ma-nō < -mnō > ā-yāt̲ (11 : 46.6.a).

at̲ yā var(ə)-šā / yā-cā +pa(i)-rī-+āiš +šyao-θnā (11 : 50.10.a).

at̲ yə̄ a-kəm drəg-vāi-tē (7 : 33.2.a).

at̲ yə̄ng A-šā-at̲-cā vōis-tā (8 : 28.10.a).

at̲ yə̄ mā nā mar(ə)x-šai-tē (7 : 51.10.a).

at̲ yūš Daē-vā vīs-pā-oŋ < -påŋ > -hō (8 : 32.3.a).

at̲ rā-tąm Za-ra-θuš-trō (7 : 33.14.a).

at̲ Vaē-dəm-nāi / va-hiš-tā sās-na-na-ąm < -nąm > (11 : 48.3.a).

at̲ vā A-šā stao-mi-ā < -myā > va-cą̊ (9 : 33.8.d).

at̲ vā us-tā-nāiš ah-vā (7 : 29.5.a).

at̲ və̄ Xšma(i)-byā a-sū-nā vaē-dā (9 : 28.10.e).

at̲ və̄ yao-jā / +Zə-viš-ta-yə̄n̲g < -tyə̄n̲g > +Ur-va-tō (11 : 50.7.a).

at̲ və̄ va-yōi aŋ-ha(i)-tī +a-pə-məm va-cō (12 : 53.7.f).

at̲ və̄ stao-tā / ao-jāi Maz-dā aŋ-hā-cā (11 : 50.11.a).

at̲ vå A-šā / ar(ə)-dra-x́yā-cā nə-maŋ-hā (11 : 50.8.c).

at̲ Vå ya-zāi / sta-vas Maz-dā A-hu-rā (11 : 50.4.a).

at̲ Vå Vaŋ-həuš / Ma-naŋ-hō hu-nar(ə)-tā-tā (11 : 50.8.d).

at̲ vå vīs-pə̄n̲g ā-yō-i (7 : 31.2.c).

at̲ zī Tōi vax-šyā Maz-dā (7 : 51.8.a).

at̲ zī θwā fšu-yan̲-taē-cā (7 : 29.6.e).

at̲ +hə̄ a-yå fra-va-rə-tā (8 : 31.10.a).

at̲ +hu-dā-naoš / i-šā-yās gərəz-dā x́i-yəm < x́yə̄m > (11 : 50.9.d).

at̲ hōi ao-jī / Za-ra-θuš-trō pao-ur-vīm (11 : 43.8.a).

at̲ hōi dā-mąm / Θwah-mī +ā +dąm A-hu-rā (11 : 48.7.d).

at̲ Hōi Dug(ə)-dā / +hu-šyao-θnā Ā-ra < Ār > -ma(i)-tiš (11 : 45.4.d).

at̲ hōi Maz-då / a-hūm da-dāt̲ A-hu-rō (11 : 46.13.c).

at̲ Hōi vah-mə̄n̲g / D(ə)mā-nē Ga-rō ni-dā-mā (11 : 45.8.e).

at̲ hōi vās-trāi / +rā-mā +då Ā-ra < Ār > -mā(i)-tīm (11 : 47.3.c)

at̲ hōi Vo-hū / S(ə)rao-šō jan̲-tū Ma-naŋ-hā (11 : 44.16.d).

at̲ hvō A-ša-hyā aŋ-hat̲ (7 : 33.3.e).

at̲ hvō Maz-dā / ī-žā-cā +ā-zu(i)-tī-cā (11 : 49.5.a).

at̲ hvō vaŋ-hə̄uš / va-hyō nā a(i)-bī-jam-yāt̲ (11 : 43.3.a).

at̲ hvō { srā-vī } / +Ka-vā-+Viš-tās-pō yā-hī (11 : 46.14.c).

a-θā īš sāz-dūm sna(i)-θi-ša-ā < -šā > (9 : 31.18.f).

a-θā nə̄'ŋ < nə̄ aŋ > -hat̲ ya-θā hvō va-sat̲ (9 : 29.4.f).

a-θā nə̄ saz-dyāi uš-tā (7 : 51.16.f).

a-θā mōi sąs-tā vo-hū vās-tryā (9 : 29.1.f).

a-θā Ra-tuš A-šāt̲-cīt̲ ha-cā (9 : Y.b).

a-θā +həm -+f(ə)ra-švā θwā xra-θwā (8 : 53.3.e).

a-θrā vācəm ba-ra(i)-tī (7 : 31.12.a).

a-dā Ta-šā Gə̄uš pərə-sat̲ A-šəm (9 : 29.2.a)

a-dā zī a-vā +Dru-jō (7 : 30.10.a).

a-dvaē-šō Ga-vōi pa(i)-tī-mra-vat (9 : 29.3.b).
a-dvā̊ a(i)-bī-dərəš-tā va-x'i-yā̊ < -x̌yā̊ > (9 : 31.2.b).
+a-δā Θwah-māi / Ā-θrē rā-tąm nə-maŋ-hō (11 : 43.9.d).
a-nāiš ā duž-var(ə)š-nā̊ŋ-hō dafš-ni-ā < -nyā > hən̲-tū (12 : 53.8.a).
a-nāiš ā ma-na-hīm a-hūm mərən̲-gə-du-yē (12 : 53.6.f).
a-nāiš ā vī-nə̄-nā-sā (7 : 32.15.a),
a-nāiš Vā̊ nōiṯ A-hu-rā [Mazdā] (7 : 28.9.a).
a-nā Mā-θrā ma-ziš-təm (7 : 28.5.e).
an-yəm Θwah-māṯ / Ā-θras-cā Ma-naŋ-has-cā (11 : 46.7.c). 140
an-yā-θā ah-māṯ Maz-dā (7 : 51.10.b).
an-yə̄n̲g ah-māṯ / yə̄ Hōi a-rə̄m man-yā-tā (11 : 45.11.c).
an-yō A-šāṯ / Θwaṯ-cā Maz-dā A-hu-rā (11 : 50.1.c).
an̲-tar(ə̄) vīs-pə̄n̲g / drəg-va-tō hax-mə̄n̲g +mru-yē (11 : 49.3.d).
a-pa-ye(i)-tī raēx(ə)-naŋ-hō vaē-dəm (9 : 32.11.d).
a-pas-cā ur-va-rā̊s-cā (7 : 51.7.b).
+a-pə-*mē'ŋ* < -mē aŋ > -hə̄uš ur-vaē-sē (7 : 51.6.f).
a-pā-nō dar(ə)-gō-jī-ā(i) < -jyā(i) > -tīm (8 : 33.5.c).
a-pō mā iš-tīm +yan̲-tā (7 : 32.9.c).
a-byas-tā' < -tā a > -hūm [yə̄] Vaŋ-hə̄uš Ma-naŋ-hō (9 : 53.5.d). 150
a-mərə-tā(i)-tī / +a-šao-nō ur-vā aē-šō (11 : 45.7.c).
a-mərə-tā(i)-tī / Da-ē-vāiš-cā ma-šyāiš-cā (11 : 48.1.c).
+A-mərə-tā-tā-+Haur-vā-tā (7 : 51.7.c).
a-yaŋ-hā xšus-tā a(i)-bī (7 : 51.9.c).
a-yā̊ +ā-rōi hā-ku-rə-nəm (8 : 33,9.e).
a-yā̊ nōiṯ ərəš vī-šyą-tā Daē-vā [-cinā] (9 : 30.6.a).
a-yā̊ +Ma(i)-ni-vā̊ va-ra-tā (8 : 30.5.a).
ar(ə)θā +vōiž-dyāi / kā-ma-hyā tə̄m mōi dā-tā (11 : 43.13.c).
ar(ə)-drō Θwā-vą̄s / +hu-zən̲-tuš spən̲-tō Maz-dā (11 : 43.3.e).
a-vaē-na-tā sū-cā ma-naŋ-hā (9 : 30.2.b) 160
a-vaē-šām nōiṯ vī-du-yē (7 : 29.3.c).
a-vaṯ xsāi aē-šē A-ša-hi-ā < -hyā > (9 : 28.4.f).
a-vaṯ yā-są̊s / hyaṯ Və̄ +iš-tā va-hiš-təm (11 : 49.12.d).
a-vaṯ Vo-hū Ma-naŋ-hā (7 : 28.10.c).
a-va-pas-tōiš / kə̄ a-pō ur-va-rā̊s-cā (11 : 44.4.c).
a-vāiš a(i)-bī yə̄n̲g da(i)n̲-tī (7 : 32.15.c).
a-vāiš (u)rvā-tāiš / yā Tū Maz-dā dī-dərə-žō (11 : 44.15.d).
a-vā Mą-θrā /, yə̄ rā-θə-mō' < -mo A > -šāṯ ha-cā (11 : 44 17.e).
[avō] ba-va(i)-tī skən̲-dō spa-ya-θra-hyā (9 : 30.10.b).
+A-šaē-cā sə̄n̲g-hō vīdā-ąm < -dąm > (9 : 32.6.f) 170
a-ša-ox-ša-yan̲-tā̊ sar(ə)-dyā-yā̊ (9 : 33.9.b).
a-šao-nō Za-ra-θuš-tra-he (8 : Yā. b).
A-šā-hi-ā < -hyā > A-mərə-tā-tas-cā (9 : 31.6.d).
A-ša-hyā āž-dyāi gərəz-dīm (7 : 51.17.f).
A-ša-hyā gaē-θā̊ vī-mərən̲-ca(i)-tē (9 : 31.1.d).

A-ša-hyā nąs-vå pa-θō (7 : 51.13.f).
A-ša-hyā +Mąz-dås-cā [taibyō dāt̰] +sa-rəm (8 : 53.3.d).
A-ša-hyā mā / ya-vat̰ i-sāi ma-na-yāi < manyāi > (11 : 43.9.e).
A-ša-hi-ā < -hyā > yā-sā a-šīm (8 : 54.1.e).
A-šəm-cā taē(i)-byō dåŋ-hā (7 : 34.1.c).
A-šəm-cā frā-dat̰-gaē-θəm (7 : 33.11.c).
A-šəm-cā yā-nāiš za-ra-naē-mā (9 : 28.9.b).
A-šəm dərə-dyāi / tat̰ mōi då Ā-ra < Ār > -ma(i)-tē (11 : 43.1.d).
A-šəm Ma(i)n-yuš Spə̄-niš-tō (7 : 30.5.c).
A-šəm va-caŋ-hā +šyao-θnā [-cā] hap-tī (9 : 31.22.d).
A-šəm Vo-hū Ma-naŋ-hā (7 : 51.20.c).
A-šəm vo-hū va-hiš-təm as-tī uš-tā's < -tā as > -tī (12 : A.1).
A-šəm +šyao-θnāiš / +bą-za(i)-tī Ā-ra < Ār > -ma(i)-tiš (11 : 44.6.c).
A-šəm sū(i)-dyāi / t̰kaē-šāi rā-ša-yeŋ́-hē Druxš (11 : 49.3.b).
A-šā a-θā nå θrāz-dūm (7 : 34.7.f).
A-šā an̲-tar(ə̄)-ca-ra(i)-tī (7 : 51.1.d).
A-šā kat̰ Θwā dar(ə)-są-nī (7 : 28.5.a).
A-šā-cā i-šu-dəm stu-u < stū > -tō (9 : 34.15.d).
A-šā-cā cōiš ra-nōi-byā xšnū-təm (9 : 31.3.b).
A-šāi-cā Yū-šma(i)-byā gərə-zē (8 : 32.9.f).
A-šāi[-cā] sa-vāiš ci-vī-šī (7 : 51.15.f).
a-šā-u-nī a-ša-va-byō (8 : 53.4.c).
a-šāu-nē cōiš / yā zī cī-cā va-hiš-tā (11 : 47.5.b).
A-šāt̰ ā ərə-zūš pa-θō (7 : 33.5.e).
A-šāt̰ ha-cā' < -cā A > -hū-rō Maz-då (8 : 53.1.c).
A-šāt̰ ha-cā Gąm vī-dat̰ (7 : 51.5.b).
A-šāt̰ ha-cā / +Maz-då vaē-dā yə̄ īm dāt̰ (11 : 45.4.b).
A-šāt̰ ha-cā yā-oŋ < yåŋ > -hąm-cā (8 : Ye.c).
A-šā Da-ē-nå fra-dax-šā-ya (9 : 33.13.f).
+Ašā-+fra-da-θāi a-spərə-za-tā (9 : 31.16.d).
A-šā mat̰ Ā-ra < Ār > -ma(i)-tiš +vax-šat̰ (9 : 34.11.d).
+A-šā-+yux-tā / yā-hī Də̄-Jā-ma-ā < -mā > -spā (11 : 49.9.d).
A-šā vərən̲-tē tat̰ Xša-θrəm (7 : 51.18.c).
A-šā və̄ an-yō a(i)-ni-īm < -nīm > vī-və̄n̲g-ha-tū (12 : 53.5.e).
A-šā vīs-pə̄n̲g šyao-θa-nā (7 : 28.1.d).
A-šā Vo-hū Ma-naŋ-hā (7 : 33.7.c).
„ „ „ (7 : 34.5.c).
A-šā vi-yąm < vyąm > / ye-hyā hi-θāuš Nā Spən̲-tō (11 : 48.7.c).
A-šā ha-zō ə̄-ma-vat̰ (7 : 33.12.e).
A-šā huš-ha-xā xᵛə̄n-vā-tā (8 : 32.2.d).
+a-šī-cā Ā-ra < Ār > -ma(i)-tī (7 : 31.4.c).
a-šīm A-šāi / Vo-hū Xsa-θrəm Ma-naŋ-hā (11 : 46.10.c).
+a-šīm-cā šyao-θa-na-nąm vī-duš (9 : 28.4.c).
a-šīm +šyao-θnāiš / Vo-hū dā(i)-dīt̰ Ma-naŋ-hā (11 : 43.16.e).

+a-sīš-təm ə̄-ma-vaṉ-təm (7 : 34.4.c). 220
ast-vai-tē uš-tā-nā-i dā-tā (9 : 34.14.b).
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a-zə̄m-cīṯ a-hyā Maz-dā (7 : 29.10.e).
a-zə̄m tāiš Θwā / fra-xšnī a-vā-mī Maz-dā (11 : 44.7.d).
a-zə̄m Tōi āiš / pou-ru-yō fra-vōi-vī-dē (11 : 44.11.d).
{a-zə̄m} +ya-θā / və̄ afš-mā-nī səṉg-hā-nī (11 : 46.17.c).
+az-dā-+zū-tā / +Va-hiš-tāṯ-cā Ma-naŋ-hō (11 : 50.1.d).
A-hu-ra-hi-ā < -hyā > [urvāzəmā] Maz-dā̊ (7 : 32.1.d).
A-hu-ra-hyā zao-šē Maz-dā̊ (9 : 33.2.f). 230
A-hu-rəm a-ša-va-nəm (7 : 31.10.c).
A-hu-rəm yā-sā vāu-nuš (7 : 28.8.c).
A-hu-rā A-šāi-+cā (7 : 51.2.b).
A-hu-rā nū nā̊ a-var(ə) (7 : 29.11.e).
A-hu-rō aŋ-həuš / / zą-θōi pou-ru-ye-hyā (11 : 48.6.d).
A-hu-rō A-šā-hiz-vā̊ (7 : 51.3.c).
A-hu-rō Xša-θrā Maz-dā̊ (7 : 51.6.c).
+A-hūm-+Biš Vīd-vā-ō < -vā̊ > A-hu-rā (9 : 31.19.b).
ah-ma(i)-byā-cā A-hu-rā (7 : 28.6.e).[1]
ah-māi aŋ-haṯ Va-hiš-təm (7 : 31.6.a). 240
Ah-māi A-šā noiṯ sar(ə)-jā (7 : 29.3.a).
ah-māi gaē-θā̊ / Vo-hū frā-daṯ Ma-naŋ-hā (11 : 46.13.d).
ah-māi-cā Xša-θrā ja-saṯ (7 : 30.7.a).
ah-māi dā-ąn < dąn > / +Haur-vā-tā-+A-mərə-tā-tā (11 : 47.1.c).
ah-māi [nə̄] saz-dyāi bao-daṉ-tō pa(i)-tī (9 : 30.2.f).
ah-māi mīž-dəm / ha-nəṉ-tē pa-rā-a < -rā > -hūm (11 : 46.19.c).
ah-māi stōi dān / +tə-vī-šī-+u-ta-yū(i)-tī (11 : 45.10.e).
Ah-māṯ a-vā ma-naŋ-hā (7 : 33.6.c).
ah-māṯ Man-yəuš / +rā-rəš-yaṉ-tē drəg-vaṉ-tō (11 : 47.4.a).
a-hyā aŋ-həuš / ast-va-tō ma-naŋ-has-cā (11 : 43.3.c). 250
< ahya > a-hi-ā aŋ-hə̄uš vīs-pā maē-θā (9 : 34.6.d).
A-hyā xra-tū / frō mā sās-tū va-hiš-tā (11 : 45.6.e).
a-hyā +grə̄h-mō ā-hōi-θōi (7 : 32.14.a).
a-hyā Daē-vā +mā +ha-mōi-+ma-nōi (9 : 32.1.c).
a-hyā +f(ə)ra-səm / kah-māi vī-vī-du-yē va-šī (12 : 43.9.c).
a-hyā Man-yəuš / Tvə̄m a-hī +Pa-tā Spəṉ-tō (11 : 47.3.a).
a-hyā Man-yəuš / Spə̄-niš-ta-hyā Va-hiš-təm (11 : 47.2.a).
a-hyā yā-sā nə-maŋ-hā (7 : 28.1.a).
a-hyā Vaŋ-hə̄uš Ma-naŋ-hō +šyao-θnā (9 : 34.10.a).
a-hyā Vərə-zə̄-nəm maṯ A(i)r-yam-nā (9 : 32.1.b). 260
a-hyā Vo-hū / ao-šō vī-dā Ma-naŋ-hō (11 : 49.1.d).
a-hyā +šyao-θnāiš / A-kāṯ +ā +šyąs Ma-naŋ-hō (11 : 47.5.d).
a-hyā zao-šə̄ṉg / uš-tiš var(ə)-nəṉg ha-ca(i)-tē (11 : 48.4.c).

a-hyā zərə-dā-cā ma-naη-hā-cā (9 : 31.12.d).
a-hvā-hū daxš-təm dā-vōi (7 : 51.9.d).
A-x'yā-cā Xᵛaē-tuš yā-sat̰ (7 : 32.1.a).

ā

ā A(i)r-yə̄-mā i-ši-ō < -šyō > raf(ə)-δrā-i jan̰-tū (12 : 54.1.a).
ā īš dvaf-šə̄n̰g / Maz-dā ⁺nā-šē ą̄s-tās-cā (11 : 44.14.e).
⁺ā-kā-⁺stə̄n̰g mā / nī-šą̄-syā dā-θəm dā-hvā (11 : 50.2.d).
ā-kā̊ ar(ə)-drə̄n̰g / D(ə)mā-nē Ga-rō s(ə)rao-šā-nē (11 : 50.4.d).
ā xša-θrəm Vaη-həuš Ma-naη-hō (8 : 33.5.d).
ā-xsō Vaη-hə̄uš / A-šā īš-tiš Ma-naη-hō (11 : 46.2.e).
Ā-θrā ⁺vaη-hā / ⁺vī-dā(i)-tē rā-nō-i-byā (11 : 47.6.b).
ā-dā-i ka-hi-ā < -hyā > -cīt̰ pa(i)-tī (9 : 33.11.f).
ā-nuš-haxš Ā-ra < Ār > -ma(i)-tiš ma(i)n-yū (9 : 31.12.e).
ā ma-ziš-tām ⁺ya-ma(i)-tē bū-jəm (9 : 31.13.d).
ā mā Aēš-mō ha-zas-cā [rəmō] (7 : 29.1.c).
ā mā āi-dūm Va-hiš-tā (7 : 33.7.a).
ā mōi raf(ə)-δrāi za-və̄n̰g ja-sa-tā (9 : 28.3.f).
⁺ā ⁺mō-yas-trā ba-ra-nā' < -nā A > -šā-cā (9 : 30.9.d).
ā və ⁺Gə̄uš ⁺a ⁺hə̄m-yan̰-tū (7 : 51.3.a).
⁺ā ⁺zī d(ə)mā-nəm vī-səm vā (7 : 31.18.c).
⁺ā ⁺hi-šā-yā dərəš-cā tə-viš-cā (9 : 29.1.d).
⁺ā ⁺hu-ši-tōiš Vaη-hə̄uš Ma-naη-hō (9 : 30.10.d).
ā-yap-tā A-šāt̰ ha-cā (7 : 28.2.e).
ā-rōi zī Xšmā / Maz-dā A-šā A-hu-rā (11 : 50.3.a).
ā-rōi zī hu-dā-oη < dā̊η > -hō (7 : 34.3.e).
< Ār > Ā-ra-ma(i)-tī tə-vī-šīm da-svā (9 : 33.12.b).
< Ār > Ā-ra-ma(i)-tī / ⁺ha-ci-ma-nō īt̰ ā-rəm (11 : 43.10.b).
< Ār > Ā-ra-ma-tōiš / ux-δāiš ⁺šyao-θnā ərəš ⁺da(i)-dyāt̰ (11 : 44.10.d).
< Ār > Ā-ra-ma-tōiš / kas-cīt̰ A-šā hu-zən̰-tuš (11 : 49.5.c).
< Ār > Ā-ra-ma-tōiš / gaē-θā̊ frā-dō θwax-šaη-hā (11 : 46.12.c).
< Ār > Ā-ra-ma-tōiš nā spən̰-tō [hvō] (7 : 51.21.a).
< Ār > Ā-ra-ma-tōiš / ⁺bą̄-zaη-hā A-sa-x́yā-cā (11 : 47.6.c).
< Ār > Ā-ra-ma-tōiš / zas-tōi-byā ⁺šyao-θnā vərə-zyat̰ (11 : 47.2.c).
ā-var(ə)-nā̊ vī-ci-θa-hyā (7 : 30.2.c).
ā-viš nā̊ ⁺an̰-tar(ə̄)-hə̄n̰-tū (7 : 33.7.c).
ā-sk(ə)tīm Xšmā-ką̄m / hyat̰-cā mōi x́yāt̰ vāxš aē-šō (11 : 44.17.c).

ə̄

ə̄(ə)-ā-nū i-ši-ə̄n̰g < -šyə̄n̰g > aη-ha-yā (9 : 32.16.f).
ə̄-ma-va(i)-tīm / si-ną̄m dā-vōi drəg-va-sū (11 : 44.14.d).
ə̄h-ma-ā < -mā > rā-tōiš Yūš-mā-va-tą̄m (9 : 29.11.f).
ə̄h-ma-ā < -mā > pou-ru-tə-māiš das-tē (9 : 34.1.f).

ā̊

ā̊s-cā hu-dā̊η-hō ərəš vī-šyā-tā (9 : 30.3.e).

ą̄

âs-tə̄ng ah-māi / yə̄ nå̄ ą̄s-tāi da(i)-dī-tā (11 : 46.18.c).

i

i-θā ī ha(i)-θyā na-rō a-θā jə̄-na-yō (12 : 53.6.a).
(i)rix-təm Maz-da-ā < -dā > Va-ē-diš-tō [ahī] (9 : 32.7.f).
i-šən-tī mā / tā Tōi Vo-hū Ma-naŋ-hā (11 : 46.9.e).
is-vā-cīt hą̄s / pa-raoš a-kō drəg-vā(i)-tē (11 47.4.d).

ī

+Ī-šō-+Xša-θrəm-cā +sra-vaŋ-ha-ą̄m < -hą̄m > (9 : 28.9.f).

u

ux-δa-x́yā-cā s(ə)rao-šəm xša-θrəm-cā (9 : 33.14.f). 310
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ux-δāiš Vaŋ-hə̄uš Ma-naŋ-hō (7 : 51.3.d).
+u-ta-yū(i)-tī-+tə-vī-šī (7 : 34.11.c).
+u-ta-yū(i)-tī- / +tə-vī-šī +ga-tōi va-sə-mī (11 : 43.1.c).
u-ta-yū(i)-tī Haur-va-tās drao-nō (9 : 33.8.f).
u-ta-yū-tā / yā +nərəš sā-drā drəg-va-tō (11 : 45.7.d)
u-pā-ji-mən / +Haur-vā-tā.+A-mərə-tā-tā (11 : 45.5.d).
ur-va-θō' < -θō A > -šā / nə-maŋ-hā Za-ra-θuš-trō (11 : 50.6.b).
Ur-va-θō +Brā-tā / / +Ptā vā Maz-dā A-hu-rā (12 : 45.11.e).
< urvā > (u)ru-vā -tōiš vā / hu-zə̄n-tuš mi-θrōi-byō vā (11 : 46.5.b). 320
+ur-vā-+dyå̄ st(a)vas a-yə-nī pa(i)-tī (9 : 34.6.f).
uš-tā ah-māi / yah-māi uš-tā kah-māi-cīt (11 : 43.1.a).
uš-tā ah-māi hyat A-šāi Va-hiš-tāi a-šəm (12 : A.b).
uš-tā yə̄ A-šəm dā-drē (7 : 51.8.d).
+us-tā-na-+zas-tō raf(ə)-δra-hi-ā < -hyā̊ > (9 : 28.1.b).
uš mōi uz-ār(ə)-švā' < -švā A > -hu-rā (7 : 33.12.a).
+uz-+i-r(ə)i-dyāi / +a-zə̄ +sar(ə)-da-nō sə̄ng-ha-hyā (12 : 43.14.d).
+uz-+i-r(ə)i-dyāi / pa-rā hyat mōi ā-ji-mat (11 : 43.12.c).
uz-ū(i)-θyōi īm / Maz-dā xrūn-yāt A-hu-rā (11 : 46.5.e).

ərə

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ərəš mōi +ū-cām / Vaŋ-hə̄uš va-fuš Ma-naŋ-hō (11 : 48.9.c).
ərəš-vā Xša-θrā / Θwā-vą̄s +a-sīš-tīš Maz-dā (11 : 44.9.d).
ərəš-vāiš tū Ux-δāiš Maz-dā (7 : 28.6.c).
ərəš vī-ci-dyāi / ya-θā ī srā-va-yaē-mā (11 : 49.6.c).
ərəž-ux-δāi va-caŋ-ha-ām < -hām > (7 : 31.19.e).
ərəž(ə)-jīš A-šā / pou-ru-šū +hvar(ə̄)-+piš-ya-sū (11 : 50.2.c).

ō

ō-yā cis-tī / hvō Pa-tā' < -tā A > -šā-hyā Maz-då̄ (11 : 47.2.d).

k

kaē(i)-byō a-zīm / rā-nyō-skərə-tīm Gā̧m ta-šō (11 : 44.6.e).
kaē(i)-byō ū-θāi / Vo-hū ji-mat̲ Ma-naη-hā (11 : 46.3.d).
ka-tā-rəm a-ša-vā vā (7 : 31.17.a). 340
ka-tārəm ā / ang̲-rō vā hvō vā +aη-rō (11 : 44.12.c).
kat̲ a-ša-vā / Maz-dā vəng̲-hat̲ drəg-van̲təm (11 : 48.2.c).
kat̲ Tōi A-šā / za-ba < zba > -yən̲-tē a-vaη-hō (11 : 49.12.a).
kat̲ Tōi rā-zar(ə) kat̲ va-šī (7 : 34.12.a).
kat̲ mōi Ur-vā / +i-sē ca-hyā a-vaη-hō (11 : 50.1.a).
kat̲ vā stū-tō kat̲ vā yas-na-hyā (9 : 34.12.b).
kat̲ Və Xša-θrəm kā īš-tīš (7 : 34.5.a).
ka-θā aη-həuš / va-hiš-ta-hyā pao-ur-vīm (11 : 44.2.b).
ka-θā a-yār(ə) / dax-šā-rā f(ə)ras-yāi dī-šā (11 : 43.7.d).
ka-θā A-šā / tat̲ mīž-dəm ha-nā-nī (11 : 44.18.b). 350
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ka-θā Θu-ā < Θwā > / Maz-dā xšnao-šāi A̧-hu-rā (11 : 46.1.e).
ka-θā Dru-jəm / niš ah-māt̲ ā [niš] nā-sā-mā (11 : 44.13.b).
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ka-θā Maz-dā / za-rəm ca-rā-nī ha-cā Xšmat̲ (12 : 44.17.b).
ka-θā mōi yā̧m / [yaoš] Da-ē-na-ā̧m < -nā̧m > +yaož-+dā-nē (11 : 44.9.b).
ka-dā a-jən / mū-θrəm a-hyā +ma-da-hyā (11 : 48.10.b).
ka-dā Maz-dā / A-šā mat̲ Ā-ra < Ār > -ma(i)-tiš (I1 : 48.11.a). 360
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Kar(a)-pa-nō vās-trāt̲ a-rəm (7 : 51.14.b).
+Ka-vā [-cā] -+Viš-tās-pō Za-ra-θuš-triš (9 : 53.2.c).
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kas-tē Vo-hū Ma-naη-hā (7 : 29.7.e).
kas-nā dərə-tā / zā̧m-cā a-də na-bā̊s-cā (11 : 44.4.b).
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kā təm a-hyā / +maē-niš aη-hat̲ pou-ru-yē (11 : 44.19.d).
+kā-tē sū(i)-dyāi / yə ī {dā-yāt̲} pa(i)-ti-šāt̲ (11 : 44.2.c).
kā tōi a-šōiš / Θwa-xyā̊ ma(i)-byō A-hu-rā (11 : 48.8.b).
kā Tōi Vaη-həuš / Maz-dā Xša-θra-hyā īš-tīš (11 : 48.8.a).
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kə̄ a-ša-vā / yā-iš pərə-sāi drəg-vå vā (11 : 44.12.b).

kə̄ ur-va-θō Spi-ta-māi (7 : 51.11.a).

kə̄ uz(ə)-məm cō-rət / / vyā-na-yā pu-θrəm pi-θrē (12 : 44.7.c).

kə̄ bərəx-ą̄m tāšt / Xša-θrā mat̲ Ā-ra < Ār > -ma(i)-tīm (11 : 44.7.b).

kə̄ mōi pa-sə̄uš / kə̄ mə̄ nā θrā-tā vis-tō (11 : 50.1.b).

kə̄ yā u-šå / a-rə̄m-pi-θwā xša-pā-cā (11 : 44.5.d).

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kə̄ vā Vaŋ-hə̄uš Ma-naŋ-hō (7 : 51.11.e).

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kə̄ vərə-θrəm-jā / Θwā pōi sə̄ng-hā yōi hən̲-tī (11 : 44.16.b).

kə̄ Hu-ā < Hvā > -på / rao-cås-cā dāt̲ tə-mås-cā (11 : 44.5.b).

kə̄ Hu-ā < Hvā > -på / xᵛaf-nəm-cā dāt̲ zaē-mā-cā (11 : 44.5.c).

kə̄ hvō yə̄ mā / ar(ə)-drō cōi-θat̲ pou-ru-yō (11 : 46.9.a).

kə̄ng ā Vaŋ-hə̄uš / ji-mat̲ Ma-naŋ-hō cis-tiš (11 : 48.11.d).

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kə̄m hōi uš-tā A-hu-rəm (7 : 29.2.e).

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ku-θrā' < -θrā ā > -rōiš ⁺ā ⁺fsə-ra-tuš (7 : 51.4.a).

ku-θrā tōi ar(ə)-drā Maz-dā (7 : 34.7.c).

ku-θrā Θwā Xša-θrā Maz-dā (7 : 51.4.f).

ku-θrā Ma-nō Va-hiš-təm (7 : 51.4.e).

ku-θrā mərəž-di-kā axš-tat̲ (7 : 51.4.b).

ku-θrā ya-sō x'yə̄n A-šəm (7 : 51.4.c).

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< kū > ku-u a-ša-vā A-hu-rō (8 : 53.9.c).

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x

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Xša-θrəm-cā ī-ša-na-ą̄m < -ną̄m > Dru-jəm (9 : 32.12.f).

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xša-θrāiš yū-jə̄n / Kar(a)-pa-nō Kā-va-yas-cā (11 : 46.11.a).

Xša-θrā-cā yā / ī-šō ståŋ-hat̲ ā pa(i)-θī (11 : 50.4.c).

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g

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ga-ye-hyā +šyao-θnāiš va-hyō (7 : 51.19.f).
+Ga-rō-+D(ə)mā-nē A-hu-rō (7 : 51.15.c).
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gūš-tā yə̄ man̲-tā A-šəm (7 : 31.19.a).
gərə-zōi Tōi ā / īt̲ +ā-vaē-nā A-hu-rā (11 : 46.2.c).

c

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j

ja-ma(i)-tī aē-naŋ-ha-ąm < -hąm > (7 : 30.8.b).
ja-yāiš +pərə-tūš / vah-ma-hyā Yūš-mā-ka-hyā (11 : 50.7.b).
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t

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tat̰ Maz-dā Ta-va-ā < -vā > Xša-θrəm (8 : 53.9.e).
tat̰ mōi xra-təuš / ma-naŋ-has-cā vī-ci-θəm (11 : 46.18.e).
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tat̰ mōi vī-ci-dyāi vao-cā (7 : 31.5.a).
tat̰ və̄ nə̄ Ha-zao-šā̊ŋ-hō (7 : 51.20.a).
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t̲

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θ

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Θwa-hyā mą-θrā-nō dū-tīm (7 : 32.13.e).
Θwā Ā-θrā su-xra Maz-dā (7 : 31.19.e). 560
,, ,, ,, ,, (7 : 51.9.b).
Θwā cī-cī-θwā / Spō-niš-tā Ma(i)n-yū Maz-dā (11 : 43.2.c).
Θwā Ma-naŋ-hā xra-tūš-eā (7 : 31.11.c).
Θwā-vąs Maz-dā A-hu-rā (7 : 31.16.e).
Θwā-vąs Maz-dā / Vaŋ-hōuš xra-θwā Ma-naŋ-hō (11 : 48.3.d).
Θwā hu-na-rā / dā-mōiš ur-vaē-sē' < -sē ⁺a > -pə-mē (11 : 43.5.e).
Θwō ā ⁺gōuš-⁺ta-šā ā-ās < ⁺ās > xra-tuš (9 : 31.9.b).
< Θwąm > Θu-ąm ⁺mōng-hī Pao-ur-vīm Vaē-dəm (9 : 29.10.f).
Θwōi ā-ās < ⁺ās > Ā-ra < Ār > -ma(i)-tiš (7 : 31.9.a).
Θwōi dū-tåŋ-hō åŋ-hā-mā (7 : 32.1.e). 570
θrā-yōi-dyā-i dri-gūm Yūš-mā-kəm (9 : 34.5.d).

d

Da-ē-na-yā vaē-dəm-nō (7 : 51.19.c).
Da-ē-na-yāi vaŋ-hu-yāi (7 : 51.17.c).
Da-ē-na-yāi vaŋ-hu-yāi ya-vōi vīs-pāi ā (12 : 53.4.f).
Da-ē-na-yå vaŋ-hu-yå ux-δā ⁺šyao-θnā-cā (12 : 53.1.f).
Da-ē-nā A-šəm spən̲-vat̲ (7 : 51.21.c).
Da-ē-nā ⁺ərə-zaoš ha(i)-θīm (7 : 51.13.b).
Da-ē-nå Sao-šyan̲-ta-ąm < -tąm > (7 : 34.13.c).
Daē-vā-iš-cā xrafs-trāiš maš-yāiš-cā (9 : 34.5.f).
Daē-vā-iš-cā maš-yāiš-cā (7 : 29.4.c). 580
dax-šat̲ ⁺ux-šyāi / ⁺tu-šnā-⁺ma(i)-tiš va-hiš-tā (11 : 43.15.c).
da-dā(i)-tī paur-va-tā-təm (7 : 33.14.c).
da-dāt̲ Ā-ra < Ār > -ma(i)-tiš ą-na < ąn > -mā (9 : 30.7.d).
dan̲g-rā Man̲-tū / A-šā Maz-då A-hu-rō (11 : 46.17.e).
dar(ə)-ga-hyā ⁺yaoš / yōm Vå naē-⁺ciš dār(ə)št i-tē (11 : 43.13.d).
dar(ə)gəm ā-yū tə-maŋ-hō (7 : 31.20.c).
darš-tōiš-cā hōm-parš-tōiš-cā (7 : 33.6.f).
da-vąs-ci-nā hu-mərə-tōiš baxš-tā (9 : 31.10.f).

da-sā as-på / arš-na-va(i)-tiš uš-trəm-cā (11 : 44.18.c).
dā(i)-dī A-šā tąm a-šīm (7 : 28.7.a). 590
dā(i)-dī A-sā-dā-ō < -då > dar(ə)-gā-yū (9 : 28.6.b).
dā(i)-dī tū Ā-ra < Ār > -ma(i)-tē (7 : 28.7.c).
dā(i)-dī mōi Yə̄ Gąm ta-šō (7 : 51.7.a).
dā-tā aŋ-hə̄uš / ar(ə)-dat̲ Vo-hū Ma-naŋ-hā (11 : 50.11.c).
Dā-tā Xra-tə̄uš / hi-zu-ō < -zvō > rā(i)-θi-īm < θīm > stōi (11 : 50.6.c).
dā-tā [və̄] +A-mərə-tā-tas-cā (7 : 33.8.e).
dāt̲ tə-vī-šīm / Vaŋ-hə̄uš Ma-naŋ-hō bərəx-δē (11 : 48.6.b).
dā-θra-na-ąm < -nąm > ha-cā a-šāu-nō (9 : 31.14.d).
dā-yąt̲ aŋ-hə̄uš / yā Tū vōis-tā va-hiš-tā (11 : 46.10.b).
< dåŋ > dā-oŋ -hō ərə-zu-uš < -zūš > pa-θō (8 : 53.2.e). 600
dås-tū Maz-dā xša-yā-cā (7 : 28.7.e).
dą-mīm vīd-vå +ha(i)-θyąm A-ša-hyā (9 : 34.10.d).
di-vam-nəm hōi a-pa-rəm +xša-yō (9 : 31.20.b).
du-ši-tā-cā mar(a)-kaē-cā (7 : 31.18.e).
duš-šyao-θa-nā a-va-za-zat̲ (8 : 34.9.c).
duš-šyao-θa-nāi A-hu-rā (7 : 31.15.c).
duš-sas-tiš sra-vå mōr(ə)n̲-dat̲ (7 : 32.9.a).
+duš-+xvar(ə)-θəm +a-va-ē-tās-+va-cō (9 : 31.20.d).
+duž-+a-zō-bå hąs / / xvaiš +šyao-θnāiš a-hə̄-mus-tō (12 : 46.4.c).
duž-Da-ē-nəŋg / duš-ma-naŋ-hō drəg-va-tō (11 : 49.11.b). 610
duž-var(ə)-nāiš va-ē-šō rās-tī [tōi] nar(ə)-pīš +ar(ə)-jiš (12 : 53.9.a).
dōi-šā mōi iš-tōiš Xša-θrəm (7 : 51.2.c).
dōi-šī mōi yā Və̄ a-bi-frā (8 : 33.13.d).
drəg-va-taē-cā hyat̲-cā a-šāu-nē (9 : 33.1.d).
drəg-vå vā +vərə-nu(i)-tē ma-zi-yō < -zyō > (9 : 31.17.b).
Dru-jas-cā pa(i)-rī-ma-tō-iš-cā (9 : 32.3.d).
[Drujō] ā-ye-sē [hōiš piθā] tan-vō pa-rā (7 : 53.6.c).
Dru-jō D(ə)ma-nē ā-dā-āt̲ < -dāt̲ > (7 : 51.14.f).
Dru-jō D(ə)mā-nē / ha(i)-θyā aŋ-hən as-ta-yō (11 : 49.11.d).
Dru-jō [hacā] rā-θə-mō +yə̄m spa-šu-θā frā(i)-di-īm <-dīm> (12 : 53.6.b). 620
+Dru-jō hu-ō < hvō > / +dā-mąm +haē-θa-hyā +ā-+gāt̲ (11 : 46.6.b).

n

naē-cīt̲ vīd-vå +ao-jō hā-drō-yā (9 : 32.7.b).
naē-cīm tə̄m an-yəm Yūš-mat̲ vaē-dā (9 : 34.7.e).
naē-dā daƙ-yə̄uš / yōi sās-tā-rō drəg-van̲-tō (11 : 46.1.d).
naē-dā Ra-tuš A-šāt̲-cīt̲ ha-cā (9 : 29.6.d).
naē-dā var(a)-nā / nōit̲ ux-δā naē-dā +šyao-θnā (11 : 45.2.d).
naē-dā Vo-hū / Maz-dā fraš-tā Ma-naŋ-hā (11 : 49.2.d).
+na-rə̄m-+na-rəm xva-ƙyāi ta-nu-yē (9 : 30.2.d).
na-rōi F(ə)ra-šaoš-trā-i ma(i)-byā-cā (9 : 28.8.d).
nas-yan̲-tō Ašā-at̲-cā (7 : 32.4.f). 630
nə-maŋ-hā A-šā-i-cā dā-mā (9 : 34.3.b).

nə-maŋ-hō ā / ya-θā nə-mə̄ Xšmā-va-tō (11 : 44.1.b).
nə-mas-cā yā / Ā-ra < Ār > -ma(i)-tiš ī-žā-cā (11 : 49.10.c).
nə-ma-x^{v}a(i)-tiš ci-θrå rā-ta-yō (9 : 33.7.f).
nə-mō və̄ Gā-θå a-šao-nīš (8 : Yā.d).
nā-sat̲ x^{v}ā-θrəm [drəgvōdəbyō] +jīt̲-+ar(ə)-taē(i)-byō (8 : 53.6.e).
nī +Aē-šmō [nī] dyā-tąm / / pa(i)-tī rə-məm [paitī] +syō-dūm (11 : 48.7. a).
nī Kā-va-yas-cīt̲ xra-tūš +da-dat̲ (9 : 32.14.b).
nī hīm m(ə)rąz-dyāi / Θwa-hyā mą-θrāiš sə̄ng-ha-hyā (11 : 44.14.c).
nū īm vīs-pā / ci-θrā zī +mąz-dåŋ-hō-dūm (11 : 45.1.c). 640
< +nū > nū-ū +zī +īt̲ / caš-ma(i)-nī vī-ā < vyā > -dar(ə)-səm (11 : 45.8.b).
nərə-byas-cā nā(i)-ri-byas-cā Za-ra-θuš-tra-hē (12 : 54.1.b).
nōit̲ aē-vā A-hū vīs-tō (7 : 29.6.c).
nōit̲ an-afš-mąm / Də-Jā-mās-pā Hu-ō < Hvō > -gvā (11 : 46.17.b).
nōit̲ A-ša-hyā / ā-dīv-ye(i)n̲-tī ha-cə-mnā (11 : 44.13.d).
nōit̲ a-hyā mā / ā-θriš šyao-θa-nāiš frō-syāt̲ (11 : 46.8.b).
nōit̲ +(u)rvā-tā- dā-tōi-byas-cā (7 : 51.14.a).
nōit̲ ərəš-va-cå / sa-rə̄m dī-dās drəg-vā-tā (11 : 49.9.b).
nōit̲ ərəz(ə)-ji-ōi < -jyōi > fra-jyā(i)-tiš (7 : 29.5.e).
nōit̲ jī-ā < jyā > -təuš xša-yam-nə̄n̲g va-sō (9 : 32.15.d). 650
nōit̲ tā īm xšnāuš vaē-pa-yō (7 : 51.12.a).
nō-it̲ { tū } duž-dā-oŋ < -dåŋ > -hō (7 : 30.3.f).
nōit̲ da(i)-bi-tīm / duš-sas-tiš a-hūm m(ə)rą-šyāt̲ (11 : 45.1.d).
nōit̲ Da-e-nå / nōit̲ +Ur-vā-nō ha-ca(i)n̲-tē (11 : 45.2.e).
nōit̲ diw-ža(i)-dyāi / Vīs-pā-hi-šas A-hu-rō (11 : 45.4.e).
nōit̲ duž-jyā-tōiš / kā-cīt̲ Maz-dā dvaē-šaŋ-hā (11 : 46.8.e).
nōit̲ nā pou-ruš / drəg-va-tō xyāt̲ ci-xšnu-šō (11 : 43.15.d).
nōit̲ nā ma-nå / nōit̲ sə̄n̲g-hā nōit̲ xra-ta-vō (11 : 45.2.c).
nōit̲ fra-sa-yā / Vaŋ-hə̄uš cāx-nar(ə) Ma-naŋ-hō (11 : 44.13.e).
nōit̲ fšu-yən̲-tē drəg-va-sū pa(i)-rī (9 : 29.3.f). 660
nōit̲ Maz-dā a-vās-tri-ō < -tryō > (7 : 31.10.e).
nōit̲ mā xšnā-uš / yə̄ +Vərə-zə̄-na-āt̲ < -nāt̲ > ha-cā (11 : 46.1.c).
nōit̲ mōi vās-tā Xšmat̲ an-yō (7 : 29.1.e).
nōit̲ Spən̲-tąm dōr(ə)št / ah-māi stōi Ā-ra < Ār > -ma(i)-tīm (11 : 49.2.c).
nōit̲ hīm mī-zəm / A-šā vās-trəm frā-da(i)ŋ́-hē (11 : 44.20.e).

p

< paity-ao > pa(i)-tyao -gət̲ +hā / ah-māi ja-sōit̲ dvaē-šaŋ-hā (11 : 46.8.c).
Pa(i)-θyaē-cā Vās-tryaē(i)-byō at̲-cā X^{v}aē-ta-o-vē (12 : 53.4.b).
+pa(i)-rī-+ga(i)-θē Xšmā-va-tō (7 : 34.2.e).
+pa(i)-rī-+cā-+ja-sāi van̲-tā (7 : 51.22.f).
+pa(i)-rī-ja-sāi / Maz-dā us-tā-na-zas-tō (11 : 50.8.b). 670
pa(i)-rī-ja-sāi Vo-hū Ma-naŋ-hā (9 : 28.2.b).
pa(i)rī X^{v}aē-təuš / +A(i)r-yam-nas-cā da-dā(i)-tī (11 : 46.1.b).
[parā] (i)vī-za-ya-θā Ma-gəm tə̄m (7 : 53.7.e).
pa-rā-cā mrao-cās ao-rā-cā (8 : 53.7.c).

pa-rā ma-zə̄ ya-å̊η < yå̊η > -hō (7 : 30.2.e).
pa-rā hyat̲ mā / yā mə̄n̲g pərə-θā ji-ma(i)-tī (11 : 48.2.b).
par(ə) Vå̊ vīs-pāiš [parə̄] vao-xə-mā (7 : 34.5.e).
parš-tə̄m zī Θwā / ya-θa-nā tat̲ ə̄-ma-va-tąm (12 : 43.10.d).
pa-sə̄uš vī-rā-at̲ [-cā] a-druj-yan̲-tō (9 : 31.15.f).
pa-sūš vī-rən̲g / ah-mā-kən̲g fra-da-θāi ā (11 : 45.9.d). 680
pərə-sat̲-cā mā / ciš a-hī ka-hyā a-hī (11 : 43.7.c).
pərə-sā a-vat̲ ya-θā hvō (7 : 31.16.a).
pərə-sā a-vat̲ yā +maē-niš (7 : 31.15.a).
pərə-sā-cā nå̊ / yā Tōi ə̄h-mā pa-raš < parš > -tā (11 : 43.10.c).
pərə-sāi-tē ya-θrā maē-θā (7 : 31.12.f).
pərəs-ma-nə̄n̲g u-pā-ja-sat̲ (7 : 30.6.c).
pou-ru-aē-nå̊ ə̄-nāxš-tā [yāiš] (7 : 32.6.a).
+Pta-rəm Vaŋ-hə̄uš / va-rəz-yan̲-tō Ma-naŋ-hō (11 : 45.4.c).

f

Fə-ra-šaoš-trā / a-θrā tū ar(ə)-drāiš i-dī (11 : 46.16.a).
Fə-ra-šaoš-trāi / (u)rvā-ziš-tąm A-ša-hyā då̊ (11 : 49.8.a). 690
f(ə)ra-šəm vas-nā ha(i)-θyəm då̊ a-hūm (9 : 34.15.f).
f(ə)-rā A-mə-šā Spən̲-tā Gā-θå̊ gə-ur-vā-in (12 : Yā.c).
frō tāiš vīš-pāiš / Cin-va-tō fra-frā Pərə-tūm (11 : 46.10.e).
frō mā sī-šā Θwah-māt̲ vao-caŋ-hē (9 : 28.11.d).
frō mōi fra-vōiz-dūm ar(ə)-θā tā (8 : 33.8.a).
frō Vå̊ fraē-šyā / Maz-dā A-šəm-cā mru(i)-tē (11 : 49.6.a).
frō Spən̲-tā Ā-ra < Ār > -ma(i)-tē (7 : 33.13.e).

b

bā-gəm a(i)-bī-ba(i)-riš-təm (7 : 51.1.b).
bū-rōiš ā A-ša-xyā-cā (7 : 31.21.c).
bərəx-δąm mōi Fə-ra-šaoš-trō (7 : 51.17.a). 700
bərəx-δąm hā(i)-tīm Vaŋ-hə̄uš Ma-naŋ-hō (9 : 32.9.d).

m

+Ma(i)n-yə̄uš-cā Vaŋ-hə̄uš vīs-pā dā-tā (9 : 34.2.b).
+Ma(i)n-yə̄uš Maz-dą pour-vīm Spən̲tā-hyā (9 : 28.1.c).
ma(i)-byā-cā yąm / Vaŋ-hāu Θwah-mī ā Xša-θrōi (11 : 49.8.c).
ma(i)-byō Xša-θrəm ao-jōn̲gh-vat̲ (31.4.e).
ma(i)-byō < Θwā > Θu-ā / sąs-trāi vərə-nē A-hu-rā (11 : 46.3.e).
ma(i)-byō dā-vō-i ah-vå̊ (7 : 28.2.c).
ma(i)-byō Maz-dā / Ta-vā raf(ə)-nō frā-xsnə-nəm (11 : 43.14.b).
ma(i)-byō za-ba < zba > -yā A-šəm (7 : 51.10.e).
Ma-ga-va-byō cōišt pa-rā (7 : 51.15.b). 710
Ma-ga-hyā Xša-θrā nąsat̲ (7 : 51.16.b).
mat̲ tāiš vis-pāiš / yōi Tōi mą-θrą ma-rən̲-tī (11 : 43.14.e).
mat̲ Vå̊ pa-dāiš / yā fra-srū-tā ī-ža-yå̊ (11 : 50.8.a).
Ma-naŋ-has-cā Vaŋ-hə̄uš Maz-dā-i (9 : 33.14.d).

Ma-naη-hā Vo-hū A-ša-ā < -šā > -cā (9 : 30.7.b).
Ma-naη-hā Vo-hū səng-hē (7 : 51.7.f).
Ma-naη-hō +Vaη-həuš vī-dō (7 : 51.18.d).
Ma-naη-hō Vaη-həuš x^{v}ən-vat̲ haη-huš [məm bəəduš] (9 : 53.4.d).
Ma-nas-cā Vo-hū a-pao-ur-vīm (9 : 28.3.c).
Ma-nas-cā Vo-hū Xa-ša < Xša > -θrəm-cā (9 : 33.11.d). 720
Ma-nas-cā Vo-hū ya-vaē-tā(i)-tē (9 : 28.11.b).
Ma-nās-cā Vo-hū vaē-də-ma-nō < -mnō > (9 : 28.5.b).
Ma-nas-cā hyat̲ Va-hiš-təm (7 : 28.9.c).
+ma-na-hī-cā +va-ca-hī-cā (8 : 30.3.c).
ma-nə vis-tāiš / mat̲ Vīs-pāiš Ga-vā a-zī (11 : 46.19.d).
Ma-nō Vo-hū / u-ru-nas-cā a-šāu-nąm (11 : 49.10.b).
Man-yəuš Maz-dā A-hu-rā (7 : 31.9.c).
Man-yəuš ha-cā Θwā (əə)ā̊η-nā (7 : 28.11.e).
mare(ə)-taē-šū xšnā-uš / / hvō [nā] +fra-srū(i)-dyāi +ərə-θwō (11 : 46.13.b).
ma-zōi Ma-gāi [ā] pa(i)-tī-zā-na-tā (9 : 29.11.d). 730
ma-zōi Ma-gāi / kə vā +fra-srū(i)-dyāi vaš-tī (11 : 46.14.b).
Maz-dā at̲ mōi va-hiš-tā (7 : 34.15.a).
Maz-dā A-šā / Ug-rəng Vo-hū Ma-naη-hā (11 : 50.7.c).
Maz-dā A-šā / Xšmā-kəm vā-rəm xšnao-šəm-nō (11 : 46.18.d).
Maz-dā A-šā / ye-hyā mā +āi-θiš dvaē-θā (11 : 48.9.b).
Maz-dā A-šā / Vaη-həuš +šyao-θnāiš Ma-naη-hō (11 : 50.9.b).
Maz-dā A-šā Vo-hū Ma-naη-hā (9 : 34.6.b).
Maz-dā ah-māi / yah-māi va-šī kah-māi-cīt̲ (11 : 46.16.e).
Maz-dā Xša-θrəm-cā Haur-va-tā-tō (9 : 34.1.d).
Maz-dā Xša-θrā / ah-mī Vo-hū Ma-naη-hā (11 : 43-6.b). 740
< Maz > Ma-za -dā Fra-dax-ša-tā < -stā > [ahī] (7 : 51.3.f).
Maz-dā fri-yāi < fryāi > Θwā-vąs sa-x́yāt̲ ma-va(i)-tē (11 : 44.1.c).
Maz-dā +Ya-zūm stō-i ma-naη-hā (9 : 31.8.b).
Maz-dā rā-rəš-ya-ąn < -yąn > ma-ńaη-hō (9 : 32.11.f).
Maz-dā Spən-tāt̲ / nōit̲ i-θā a-šā-u-nō (11 : 47.4.b).
Maz-dā-i a-vat̲ Xša-θrəm (7 : 31.6.e).
Maz-dā̊ a-yā̊ ā-si-yā̊ < -syā̊ > (7 : 31.2.e).
Maz-dā̊ A-ša-x́i-ā < -x́yā > -cā (7 : 30.10.e).
Maz-dā̊ A-hu-ra-hi-ā < -hyā > (7 : 28.4.d).
Maz-dā̊ A-hu-rā-hi-ā < -hyā > xra-təuš (9 : 32.4.e). 750
Maz-dā̊ Xša-θrā / Ā-ra < Ār > -ma(i)-ti A-hu-rō (11 : 47.1.d).
Maz-dā̊ Xša-θrā / +var(ə)-zī +nā̊ dyāt̲ A-hu-rō (11 : 45.9.c).
Maz-dā̊ Ga-vōi xšvī-dəm-cā (7 : 29.7.c).
Maz-dā̊ ja-sat̲ pou-ru-yō (7 : 51.15.d).
Maz-dā̊ da-dat̲ A-hu-rō (7 : 31.21.a).
" " " (7 : 51.21.e).
" " " (7 : 53.4.e).
Maz-dā̊ < dā̊ > dā-ā -tā mra-ot̲ (7 : 51.19.e).

Maz-då raf(ə)-δrəm ca-gə-dō (7 : 51.20.f).
Maz-då sa-xᵛār(ə̄) ma(i)-riš-tō (7 : 29.4.a). 760
⁺Maz-dås-⁺cā-⁺A-hu-råŋ-hō (7 : 30.9.c).
" ": " (7 : 31.4.b).
Maz-dås-cā Ā-ra < Ār > -ma(i)-tiš-cā (9 : 33.11.b).
Maz-da-ą̄m < dą̄m > -cā A-hu-rəm (7 : 28.3.c).
ma-hyā rā-zə̄ng / Vo-hū sā-hit̲ Ma-naŋ-hā (11 : 50.6.d).
ma-xyå iš-tōiš / Vo-hū cōi-šəm Ma-naŋ-hā (11 : 46.18.b).
ma-xyå cis-tōiš / Θwā īš-tiš u-sə̄n Maz-dā (11 : 44.10.e).
mā ə-vīd-vå a(i)-pi-d(ə)bā-va-yat̲ (9 : 31.17.d).
mā ⁺kam-nā-⁺fšvā / hyat̲-cā ⁺kam-nā-⁺nā ah-mī (11 : 46.2.b).
mā-ciš at̲ və̄ drəg-va-tō (7 : 31.18.a). 770
⁺mə̄n̲ [-cā] ⁺da(i)-dyāi ye-hyā mā ərə-šiš (8 : 31.5.d).
⁺mə̄n̲-da(i)-di-yāi < -dyāi > / yā Tōi Maz-dā ⁺ā-diš-tā (11 : 44.8.b).
Mā-θrəm yim Ha(u)r-va-tā-tō (7 : 31.6.c).
mą̄-θrąs-cā ⁺gū-ša-tā sās-nås-cā (9 : 31.18.b).
⁺Mą̄-zą̄-⁺Xša-θrā / vaz-daŋ-hā a-və̄-mī-rā (11 : 49.10.d).
⁺mi-θah-⁺va-cå vā ⁺ərəš-⁺va-cå vā (9 : 31.12.b).
miž-dəm Maz-dā ye-hyā Tū Da-θrəm (9 : 34.13.f).
⁺mē ur-vā Gə̄uš-cā a-zyå (7 : 29.5.c).

y

yae(i)-byas-cā īt̲ råŋ-haŋ-hōi (7 : 28.8.e).
Yaē(i)-byō Xša-θrəm-cā a-γžon̲-vam-nəm (9 : 28.3.d). 780
yaē(i)-byō Maz-dā / Θwōi vas-ye-tē Da-ē-nā (11 : 44.11.c).
yaē-cā as-nāt̲ / yaē-cā dū-rāt̲ i-ša-θā (11 : 45.1.b).
yaē-cā xšnao-šən A-hu-rəm (7 : 30.5.e).
yaē-cā Maz-dā ji-gərə-zat̲ kā-mē (9 : 32.13.d).
yaē-cā Hōi da-bən saš-kən-cā (8 : 53.1.e).
yaē-ša-ąm < -šąm > Tū A-hu-rā (7 : 32.7.e).
yaē-ša-ą̄m < -šą̄m > Tū pao(u)-ru-yō (7 : 51.3.e).
yaē-ša-ą̄m <-šą̄m> nōit̲ / hu-varš <hvarš> -tāiš vą̄s duž-varš-tā (11 : 49.4.c).
yaē-šū [as] pa(i)-rī pou-ru-byō (i)θye-jō (9 : 34.8.b).
yaē-šū Maz-då A-hu-rō šaē-tī (9 : 33.5.f). 790
⁺yaož-dā-ō < -⁺då > maš-yāi / / a(i)-pi zą̄-θəm va-hiš-tā (12 : 48.5.c).
⁺yat̲ Θwā mə̄n̲g-hī Po-ur-vīm (7 : 31.8.a).
ya-θa-nā vaē-dəm-nāi Ma-naŋ-hā (9 : 31.22.b).
ya-θā' < -θā a > -yaŋ-hā" < hā ā > -dā-nāiš pou-ru-yō (9 : 30.7.f).
ya-θā A-hū va(i)-ri-yō < -ryō > (7 : Y.a).
ya-θāiš i-θa var(ə)-sa(i)-tē (7 : 33.1.a).
ya-θā i-īm < īm > / mə-nāi-cā {frā} -⁺cā ⁺vao-cā (11 : 45.3.d).
ya-θā-ca'ŋ < -cā aŋ > -hat̲ ⁺a-pə-məm ⁺aŋ-hə̄uš (9 : 30.4.d).
ya-θā tå aŋ-hən ⁺hə̄n-⁺kərə-tā hyat̲ (9 : 31.14.f).
ya-θā < Θwą̄ > Θu-ā / Zə-vīš-tīm ⁺u-zə̄-mō-hī (11 : 46.9.b). 800

ya-θā nə̄ ā / Vo-hū ji-mat̲ Ma-naŋ-hā (11 : 44.1.e).
ya-θā Ra-tūm A-hu-rō vaē-dā (9 : 31.2.d).
ya-θā < Vå > Vā-ō ya-zəm-nas -[cā] (7 : 34.6.e).
ya-θā hī +Maz-dā / / ta-ē(i)-byō dā-oŋ < dåŋ > -hā (11 : 44.18.e).
ya-θrā A-šā / ha-ca(i)-tē Ā-ra < Ār > -ma(i)-tiš (11 : 46.16.c).
ya-θrā cis-tiš aŋ-hat̲ ma-ē-θā (9 : 30.9.f).
ya-θrā ma(i)n-yuš drəg-va-tō nā̧-sat̲ (9 : 53.7.d).
ya-θrā Maz-då / var(ə)-də-må̧m šaē-tī A-hu-rō (12 : 46.16.e).
ya-θrā Vaŋ-hə̄uš / Ma-naŋ-hō īš-tā Xša-θrəm (11 : 46.16.d).
ya-θrā var(ə)-nə̄n̲g va-så dā-ye-tē (9 : 31.11.f). 810
ya < -dā A > -dā' -šəm zə-vīm aŋ-hən (7 : 31.4.a).
ya-dā a-šōiš / ma-xi-yå < -xyå > +va-sə̄-+xša-yā (11 : 50.9.c).
ya-dā̧ hvō aŋ-hat̲ yā-+šyao-θnas-cā (9 : 31.16.f).
ya-yå +šyao-θnāiš / A-šəm θraoš-tā A-hu-rā (11 : 46.7.d).
ya-yå Span-yå / u(i)-tī mra-vat̲ yəm An̲g-rəm (11 : 45.2.b).
ya-yå ha-cin̲-tē +ur-vā-nō (8 : 33.9.f).
ya-vat̲ A-šā / ta-vā-cā ī-šā-i-cā (11 : 50.11.b).
ya-vat̲ ah-mat̲ a(u)-ru-nā xraf-strā (9 : 34.9.f).
ya-vat̲ ā Θwā / Maz-dā stāu-mī uf-yā-cā (11 : 43.8.e).
ya-vat̲ ā-žuš +zraz-diš-tō bū-nōi hax-ta-yå (12 : 53.7.b). 820
ya-vat i-sāi ta-vā-cā (7 : 28.4.e).
ya-vōi vīs-pāi ā hvaŋ-hə-vīm (8 : 53.1.d).
ya-vōi vīs-pāi / Dru-jō D(ə)mā-nāi as-ta-yō (11 : 46.11.e).
ya-vōi vīs-pāi / fraēš-tåŋ-hō :ā-oŋ < åŋ > -hā-mā (11 : 49.8.d).
yas-cā dā-θə̄n̲g drəg-va-tō da-dāt̲ (9 : 32.10.d).
yas-cā va-dar(ə̄) vōiž-dat̲ a-šāu-nē (9 : 32.10.f).
yas-cā vās-trā vī-vā-pat̲ (7 : 32.10.e).
yas-cā vå maš ya-za(i)-tē (7 : 32.3.c).
yas-cā Hōi vā-rāi rā-dat̲ (7 : 51.6.b).
yas-tat̲ mīž-dəm / ha-nən̲-tē nō-it̲ dā(i)-tī (11 : 44.19.b). 830
yas-tā Daē-vən̲g / a-pa-rō ma-ši-yās̲ < -šyās̲ > -cā (11 : 45.11.a).
Yas-tā Man̲-tā pou-ru-yō (7 : 31.7.a).
yas-tə̄m Xša-θrāt̲ / Maz-dā mōi-θat̲ jyā-tə̄uš vā (11 : 46.4.d).
+yas-+Tē vīs-pē-ma-ziš-təm (7 : 33.5.a).
yas-nəm Maz-dā Xsmā-va-tō (7 : 33.8.c).
ya-zəm-nåŋ-hō nə-maŋ-hā (7 : 51.20.e).
yah-māi za-və̄n̲g ji-mā kərə-du-šā (9 : 29.3.f).
yah-mī Spən-tā / Θwā Ma(i)n-yū'r < -yū ur > -vaē-sē ja-sō (11 : 43.6.a).
+yā-at̲ +yūš-+tā fra-mī-ma-θā (8 : 32.4.a).
yā an̲g-ra-yā / Kar(a)-pa-nō (u)rū-pa-ye(i)n̲-tī (11 : 48.10.c). 840
yā A-šā-at̲ < -šāt̲ > ha-cā jvā-ma-hī (9 : 31.2.f).
yā ərə-žə̄-ji-ōi < -jyōi > dā-hī dri-gao-vē va-hyō (12 ; 53.9.f).
yā Kar(a)-pō-tås-cā Kə-vī-tås-cā (9 ; 32.15.b).

yā xšа-θrā +grəh-mō hī-ša-sat̰ (8* : 32.13.a).
yā xšnə-vi-šā +Gə̄uš-+cā-+Ur-vā-nəm (9 : 28.1.f).
yā-cā A-šā / aŋ-hə̄uš a-rəm vaē-di-yāi < -dyāi > (11 : 44.8.d).
yā-cā Ka-vā / ą̄n-mə-nē (u)ru-dō-ya-tā (11 : 44.20.d).
yā-cā xra-tū / duš(ə)-xša-θrā da-xyu-na-ą̄m < -ną̄m > (11 : 48.10.d).
yā-cā var(ə)-ša(i)-tē +a(i)-pī-+cīθ-+īt̰ (9 : 29.4.d).
yā-cā Vo-hū / ux-δā fra-šī Ma-naŋ-hā (11 : 44.8.c). 850
yā-cā Vo-hū / caš-mą̄m ar(ə)-jat̰ Ma-naŋ-hā (11 : 50.10.b).
yā-cā hōi ā-rə-zu-ā < -zvā > (7 : 33.1.f f).
yā < jō > ja-o -yā sə̄ng-ha(i)-tē (7 : 32.7.c).
ya < jvant̰ō > jī-van-tō vīs-pə̄ng vāu-ra-yā (9 : 31.3.f).
yā Tōi A-šā / yā A-šāi +Gə̄uš-+Ta-šā mraot̰ (11 : 46.9.d).
yā d(ai)biš-va-tō dvaē-šå taur-v(a)yā-mā (9 : 28.6.f).
yā Da-ē-nā vai-ri-īm < -rīm > ha-na-āt̰ < -nāt̰ > mīž-dəm (12 : 54.1.d).
yā dā-tā aŋ-hə̄uš pou-ru-ye-hyā (9 : 33.1.b).
yā dā-ra-yat̰ Va-hiš-təm Ma-nō (9 : 31.7.d).
yā nōit̰ vā aŋ-hat̰ aŋ-ha(i)-tī vā (9 : 31.5.f). 860
yā fra-ci-naš drəg-van-təm xša-yō (9 : 32.5.f).
yā fra-vaxš-yā / ye-zī tā a-θā ha(i)-θyā (11 : 44.6.b).
yā fra-šā ā-vi-ši-ā < -šyā > (7 : 31.13.a).
yā bą̄-na-yən a-hūm mar(ə)-tā-nō (9 : 30.6.f).
yā maš-yā a-ciš-tā dan-tō (8 : 32.4.b).
yā Maz-dā-θā hyat̰-cīt̰ vī-du-šē (9 : 30.1.b).
yā Maz-då da-dāt̰ maš-yā-oŋ < -yåŋ > -hō (9 : 30.11.b).
yā mō-i gaē-θå / / A-šā frā-dōit̰ ha-cə̄-mnā (12 : 44.10.c).
+yā-+yas-na-ā < -na > A-mərə-tā-təm (8 : 34.1.b).
yā yə̄-mā x^{v}af(ə)-nā a-sru-vā < -srvā > -təm (9 : 30.3.b). 870
yā rao-cə̄-biš dar(ə)-sā-tā (u)rvā-zā (9 : 30.1.f).
yā råŋ-ha-yən sra-vaŋ-hā (7 : 32.12.a).
yā Vaŋ-hə̄uš a-šiš Ma-naŋ-hō (8 : 33.13.d).
yā vā Maz-dā pərə-sā(i)-tē +tā-yā (9 : 31.13.b).
yā Və̄ Mą̄-θrā +srə-vi-mā +rā-då (9 : 28.7.f).
yā vī a-šiš / +rā-nōi-byā sa-vōi +dā-yāt̰ (11 : 43.12.e).
yā vī-dā-yāt̰ +a-šiš rāš-na-ą̄m < -ną̄m > (9 : 34.12.d).
yā vərəz-ye(i)-dyāi man-tā vās-tri-yā < -tryā > (9 : 33.6.d).
yā Vo-hū šya-vāi Ma-naŋ-hā (8 : 33.8.b).
yā ša-va(i)-tē +ā +drə̄ng ərəš-våŋ-hō (9 : 29.3.d). 880
+yā-+šyao-θa-nā +yā-+va-caŋ-hā (8 : 34.1.a).
yā < sru > su-ru -yē par(ə̄) Ma-gā-u-nō (9 : 33.7.d).
yā zī ā-i-tī jə̄ng-ha-tī-cā (9 : 31.14.b).
yā zī vā-vərə-zōi +pa(i)-rī-+cīθ-īt̰ (9 : 29.4.b).
yā +hū-+kərə-tā' < -tā A > -šā-cīt̰ ur-vāx-šat̰ (9 : 34.13.d).

* This is the only irregular *pāda* in Gāθā Ahunavaiti, and indeed in all the five Gāθās. Really it ought to have had *seven* syllables.

yā hu-š(ə)i-tiš rā-mąm-cā dāt̲ (9 : 29.10.d).
yāiš a-srū-dūm būm-yå hap-ta(i)-θē (9 : 32.3.f).
yāiš a-zā-θā / mah-māi x́yā-tā a-vaŋ-hē (11 : 50.7.d).
yāiš ā aŋ-huš pou-ru-yō ba-vat̲ (9 : 28.11.f).
yāiš Gąm Kar(a)-pā / U-sixs-cā ⁺Aēš-māi dā-tā (11 : 44.20.c). 890
yāiš ⁺grəh-mā' < -mā A > -šāt̲ va-ra-tā [Karapā] (7 : 32.12.e).
yāiš dā-tā-iš / pao(u)-ru-yāiš A-hu-ra-hyā (11 : 46.15.e).
yāiš ra-pan̲-tō ⁺da(i)-dīš xu-ā < xᵛā > -θrē (9 : 28.2.f).
yāiš srā-vī xᵛa-ē-nā a-yaŋ-hā (9 : 32.7.d).
yā-nīm ma-nō yā-nīm va-cō yā-nīm šyao-θnəm (12 : Yā. a).
yə̄ a-ciš-təm vaē-naŋ-hē aog(ə)-dā (9 : 32.10.b).
yə̄ an-ac-šəm xaąn-mə̄-nē rā-dəm (9 : 29.9.b).
yə̄ a-šāu-nē va-hiš-tō (7 : 33.3.a).
< yə̄ a > *yə̄'* -hūm i-ša-sąs a(i)-bī (7 : 51.19.d).
Yə̄ ah-māi Gąm / rā-nyō-skərə-tīm hə̄m-ta-šat̲ (11 : 47.3.b). 900
yə̄ [ā] nū-rəm-cit̲ A-hu-rā hā-mō (9 : 31.7.f).
yə̄ āiš A-šəm ni-påŋ-hē (7 : 28.11.a).
yə̄ ā-yat̲ A-ša-va-nəm (7 : 31.20.a).
Yə̄ ąn-mə̄-nī / Maz-då srā-vī A-hu-rō (11 : 45.10.b).
yə̄ īt̲ ah-māi / ərəž-ux-δā ⁺nā-dā-i-tē (11 : 44.19.c).
yə̄ ī dā-yat̲ (ə̄ə)ā-vā mar(ə)-taē(i)-byō (9 : 29.7.f).
yə̄ īš jyā-təuš hə̄-miθ-yat̲ va-sə̄-i-tōiš-cā (12 : 53.9.d).
yə̄ īš pāt̲ dar(ə)-sāt̲ A-ša-hi-ā < -hyā > (9 : 32.13.f).
yə̄ īš sə̄ng-hō ⁺a-pə-məm (7 : 51.14.e).
yə̄ Ur-vā-nəm ⁺mə̄n̲-⁺ga(i)-rē (7 : 28.4.a). 910
yə̄ (u)šu-ru-yē syas-cit̲ dah-ma-hyā (9 : 32.16.b).
yə̄ xraož-diš-tə̄ng a-sə̄-nō vas-tē (9 : 30.5.d).
yə̄ Θwat̲ Maz-dā a-sruš-tīm (7 : 33.4.a).
yə̄ Da-ē-nąm / Vo-hū sarš-tā Ma-naŋ-hā (11 : 49.5.b).
yə̄ dāt̲ ma-nō / va-hyō Maz-dā aš-yas-cā (11 : 48.4.a).
yə̄ dā-θaē(i)-byō ərəš-⁺Ra-tūš (7 : 51.5.e).
yə̄ duš-ərə-θrīš / ci-xšnu-šā A-šā Maz-dā (11 : 49.1.b).
yə̄ dūr-ao-šəm sao-ca-yat̲ a-vō (9 : 32.14.f).
yə̄ drəg-vā(i)-tē xša-θrəm hu-nā(i)-ti (9 : 31.15.b).
yə̄ Drəg-vå a-ciš-tā ⁺var(ə)-zyō (8 : 30.5.b). 920
yə̄ drəg-vō-d(ə)bīš Aēš(ə)-məm vā-dā-yōit̲ (9 : 29.2.f).
yə̄ nā a-šōiš / ao-jaŋ-hā var(ə)-da-yaē-tā (11 : 50.3.c).
yə̄ Nə̄ aē-vō sās-nå gū-ša-tā (9 : 29.8.b).
yə̄ nə̄ u-sə̄n / cō-rət̲ spə̄n̲-cā a-spə̄n̲-cā (11 : 45.9.b).
yə̄ nå ərə-zuš / sa-vaŋ-hō pa-θō si-šōit̲ (11 : 43.3.b).
yə̄ nōit̲ jyō-tūm ⁺ha-nar vī-nas-tī (9 : 31.15.d).
yə̄ ma(i)-byō yaoš / ah-māi as-cīt̲ va-hiš-tā (11 : 46.18.a).
yə̄ maš-yə̄ng ci-xšnu-šō ah-mā-kə̄ng (9 : 32.8.c).
yə̄ mā drəgvå / Θwā sa-vō pa(i)-ti-ərə-tā (11 : 44.12.d).

yə̄ mā-θra-ā < -θrā > / vā-cəm Maz-dā ba-ra(i)-tī (11 : 50.6.a). 930
yə̄ mō-i A-šāt̲ / / ha(i)-θīm ha-cā var(ə)-ša(i)-tī (12 : 46.19.a).
yə̄ mōi vīd-vå vao-cat̲ ha(i)-θi-īm < -θīm > (9 : 31.6.b).
yə̄ va-hyō vaŋ-hə̄uš daz-dē (7 : 51.6.a).
yə̄ vā ka-sə̄uš aē-naŋ-hō (7 : 31.13.c).
yə̄ vā xša-yąs / a-dąs drī-tā a-yan̲-təm (11 : 46.5.a).
yə̄ vā nōit̲ aŋ-hat̲ va-ās < vās > -trī-yō < -tryō > (9 : 31.9.f).
yə̄ vā mō-i / nā g(ə)nā vā Maz-dā A-hu-rā (12 : 46.10.a).
yə̄ vā mō-i / yå gaē-θå daz-dē aē-naŋ-hē (12 : 46.8.a).
yə̄ və̄ xra-tə̄uš / Xšmā-ka-hyā ā ma-naŋ-hā (11 : 49.6.b).
yə̄ Və̄ stao-tāiš / Maz-dā frī-nāi A-hu-rā (11 : 49.12.e). 940
yə̄ Vå A-šā uf-yā-nī (7 : 28.3.a).
yə̄ Vå Maz-dā A-hu-rā (7 : 28.2.a).
yə̄ vī-ci-naot̲ / dā-θəm-cā a-dā-θəm-cā (11 : 46.17.d).
yə̄ vī-du-šē mra-va(i)-tī (7 : 51.8.f).
yə̄ Vərə-zə̄-nāi / vaŋ-u-hīm dāt̲ fra-sas-tīm (11 : 49.7.d).
yə̄ +Sə̄-viš-tō A-hu-rō (7 : 33.11.a).
yə̄ Spi-tā-məm / Za-ra-θuš-trəm rā-daŋ-hā (11 : 46.13.a).
yə̄ zao-tā A-šā +ərə-zuš (7 : 33.6.a).
yə̄ hīm ah-māi / vās-tra-va(i)-tīm stōi us-yāt̲ (11 : 50.2.b).
yə̄ hu-dā-nuš d(ə)ma-na-hyā Xša-θrəm (9 : 31.16.b). 950
yə̄ hōi da-dat̲ zas-ta-vat̲ a-vō (9 : 29.9.f).
yə̄ Hōi nōit̲ vī-dā(i)-tī (7 : 51.6.e).
yə̄ Hōi ma(i)n-yū +šyao-θnāiš [-cā] ur-va-θō (9 : 31.21.f).
yə̄n̲g Da-ē-və̄n̲g A-kas-cā Ma(i)n-yuš (9 : 32.5.d).
yə̄n̲g xᵛə̄ Ur-vā / xᵛaē-cā xrao-dat̲ Da-ē-nā (11 : 46.11.c).
yə̄n̲gs-Tū Maz-dā / ha-d(ə)mōi mi-naš A-hu-rā (11 : 46.14.d).
yə̄m Ašā Va-hiš-tā ha-zao-šəm (9 : 28.8.b).
yə̄m ā vas(ə)-mī +ī-šā-+xša-θri-īm < θrīm > (9 : 29.9.d).
yə̄m mōi mra-oš Vaŋ-hə̄uš Ma-naŋ-hō (9 : 34.13.b).
yå i-šu-dō da-dən̲-tē (7 : 31.14.c). 960
yå då A-šā / Vaŋ-hə̄uš mā-yå Ma-naŋ-hō (11 : 43.2.d).
yå då a-šīš / drəg-vā(i)-tē a-šau-nē-cā (11 : 43.4.c).
yå ma-nao-θrīš / +caz-dōŋh-van̲-təm ar(ə)-θa-hyā (11 : 44.5.e).
yå Vo-hū θraoš-tā Ma-naŋ-hā (9 : 34.3.d).
yå zī åŋ-har(ə̄) yā-os < yås > -cā hən̲-tī (9 : 33.10.b).
yås-cā Maz-dā drə-vō-d(ə)byō (7 : 31.14.e).
yås-cā Maz-dā ba-va(i)n̲-tī (7 : 33.10.c).
yąm iš-yąm A-hu-rō ma-sa-tā Maz-dā-ō < -då > (12 : 54.1.f).
yąm xšnū-təm rā-nōi-byā då (7 : 51.9.a).
yąm cis-tīm A-šā man̲-tā (7 : 51.16.d). 970
yąm Da-ē-nąm A-hu-rō Sao-šyan̲-tō da-dat̲ (12 : 53.2.f).
yąm då Ma(i)n-yū Ā-θrā-cā (7 : 31.3.a).
yąm naz-diš-tąm / gaē-θąm drəg-vå bax-ša(i)-tī (11 : 50.3.d).

+yą̊m mōi Vīd-vā̊ / Maz-dā̊ vao-cat̲ A-hu-rō (11 : 45.3.b).
yą̄m +Hu-dā-naoš / +Pa(i)-tiš sa-xyāt̲ Xša-θra-hyā (11 : 44.9.c).
yą̄m Hu-dā-ō < -dā̊ > / sās-tī A-šā A-hu-rō (11 : 48.3.b).
yām hōi iš-yą̄m dā-tū (7 : 51.17.d).
yām hōi Xša-θrā / +Vo-hū-cā +cōiš Ma-naŋ-hā (11 : 50.3.b).
yą̄s-cā hax-šāi / Xšmā-va-ta-ą̄m < -tą̄m > vah-māi ā (11 : 46.10.d).
yim dri-gu-byō da-dat̲ vās-tā-rəm (9 : Y.f). 980
Yū-zə̄m aē(i)-byō A-hu-rā (7 : 29.10.a).
Yū-zəm Maz-dā frā-xšnə-nē (7 : 29.11.c).
Yū-zəm zə-viš-ta-yā̊ŋ-hō (7 : 28.9.e).
yeŋ-he hā-tą̄m ā(a)t̲ yes-ne pa(i)-ti (9 : Ye.a).
yes-n̄i-yā < -nyā > -cā Vaŋ-hə̄uš Ma-naŋ-hō (9 : 30.1.d).
ye-zī a-θā stā ha(i)-θīm (7 : 34.6.a).
ye-zī a-dāiš / A-šā Dru-jəm və̄ng-ha(i)-tī (11 : 48.1.a).
ye-zī a-hyā / A-ša pōi mat̲ xša-ye-hī (11 : 44.15.b).
ye-zī āiš nōit̲ ur-vā-nē (7 : 31.2.a).
ye-hyā ur-vā A-šā ha-ca(i)-tē (9 : 34.2.d). 990
ye-hyā Ur-vā xrao-da(i)-tī (7 : 51.13.c).
ye-hyā mā +āi-θīš-cīt̲ dvaē-θā (9 : 32.16.d).
ye-hyā mō-ya < mō-i A > -šāt̲ ha-cā (7 : 51.22.a).
Ye-hyā vah-mē / Vo-hū fra-šī Ma-naŋ-hā (11 : 45.6.b).
ye-hyā vərə-dā va-naē-mā Dru-jəm (9 : 31.4.f).
ye-hyā +šyao-θnāiš / gaē-θā̊ A-šā frā-dən̲-tē (11 : 43.6.c).
yə̄-hyā sa-vā / i-šā-on̲ < -šā̊n̲ > -tī rā-daŋ-hō (11 : 45.7.a).
ye-xyā-cā +[hə̄m-] +myā-sa(i)-tē mi-θa-hyā (9 : 33.1.e).
+yō Spən̲-tą̄m Ā-ra < Ār > -ma(i)-tīm (7 : 34.9.a).
< yōi A > yōi'-šāi da-dən zas-ta-yō Dru-jəm (9 : 30.8.f). 1000
yōi ā Vaŋ-hə̄uš / Ma-naŋ-hō di-draγ-žō-dvē < -duyē > (11 : 48.7.b)
yōi ā̊ŋ-har(ə̄)-cā hən̲-tī-cā (7 : 51.22.d).
yōi īm f(ə)ra-šəm kərə-nā-un a-hūm (9 : 30.9.b).
yōi īm və̄ nōit̲ / i-θā Mą̄-θrəm var(ə)-šən̲-tī (11 : 45.3.c).
yōi xšnūm Vo-hū / Ma-naŋ-hā ha-cā-on̲- < -cā̊n̲ > -tē (11 : 48.12.b).
yōi Gə̄uš mōr(ə)n̲-dən [urvāxš] ux-ti ji-ō < jyō > -tūm (9 : 32.12.d).
yōi duš-xra-θwā / Aēš(ə)-məm var(ə)-dən rā-məm-cā (11 : 49.4.a).
yōi drəg-va-tō maz(i)-bīš ci-kōi-tərəš (9 : 32.11.b).
yōi nōit̲ A-šəm ma(i)n-yan̲-tā (7 : 34.8.e).
yōi mō-yah < mō-i ah > -māi / S(ə)-rao-šəm dą̄n ca-yas-cā (11 : 45.5.c). 1010
yōi Vaŋ-hə̄uš +vaē-dəm-nā Ma-naŋ-hō (9 : 34.7.b).
yōi Va-hiš-tāt̲ a-šāu-nō (7 : 32.11.e).
yōi Və̄ yōi-θə-mā das(ə)-mē stū-tą̄m (9 : 28.9.d).
yōi Və̄ +šyao-θnāiš sā-rən̲-tē (7 : 51.3.b).
yōi za-raz-dā̊ aŋ-hən Maz-dā-i (9 : 31.1.f).
yōi +za-zən̲-tē vaŋ-hāu sra-va-hī (9 : 30.10.f).
yōi zī Gə̄uš vərə-zə̄-nē a-zi-yā̊ < -zyā̊ > (9 : 34.14.d).

yōi zī jī-vā < jvā > / +åŋ-har(ə̄)-cā bu-van < bvan > -tī-cā (11 : 45.7.b).

r

rao-cə̄-biš rō-i-θwən xu-ā < x^{v}ā > -θrā (9 : 31.7.b).
rao-cå xu-ə̄ng < x^{v}ə̄ng > / as-nąm ux-šā aē-u-ruš (11 : 50.10.c). 1020
Ra-tuš +šyao-θnā ra-ziš-tā (7 : 33.1.c).
raf(ə)-δrəm cag-vå / hyat Fri-yō <Fryō> fri-yāi <fryāi> dai-dīt (11 : 46.2.d).
raf(ə)-δrā-i Vou-ru-ca-šā-nē (8 : 33.13.a).
rāš-nā jī-vąs < jvąs > / yə̄ a-ša-vā drəg-van-təm (11 : 46.5.c).
rā-ma-ąm < -mąm > -cā ā-iš da-dā-tū (9 : 53.8.d).
rā-yō a-šiš / Vaŋ-hə̄uš ga-ēm Ma-naŋ-hō (11 : 43.1.e).
rā-ša-yeŋ́-hē drəg-van-təm (7 : 51.9.c).

v

va-ir-yå stōiš / yā Θwah-mī Xša-θrōi vā-cī (11 : 43.13.e).
vaē-dā tat yā / ah-mī Maz-dā an-aē-šō (11 : 46.2.a).
vaē-dā Maz-då A-hu-rō (7 : 51.22.c). 1030
vaē-dō-dūm Da-ē-nā-biš (7 : 53.5.c).
vao-cat gar(ə)-bąm hu-xra-tuš (7 : 34.10.b).
va-o-cā moi / yā Tvə̄m Vīd-vå A-hu-rā (11 : 48.2.a).
vax-šən-tē Da-ē-vō-zuš-tā (8 : 32.4.c).
< vaŋuhī > vaŋ-hvī ā-dā / ga(i)-dī [mōi] ā mōi A-ra-pā (11 : 49.1.c).
vaŋ-hā-u vā cōi-θa(i)-tē as-tīm (9 : 33.2.d).
Vaŋ-hə̄uš A-šā / hao-zą-θwat ā Ma-naŋ-hō (11 : 45.9.e).
Vaŋ-hə̄uš ə-vis-tī Ma-naŋ-hō (8 : 34.9.d).
Vaŋ-hə̄uš ā d(ə)mā-nō Ma-naŋ-hō (8 : 32.15.f).
Vaŋ-hə̄uš ā-ya-pa-tā < -ptā > Ma-naŋ-hō (9 : 28.7.b). 1040
Vaŋ-hə̄uš xra-tūm Ma-naŋ-hō (7 : 28.1.e).
Vaŋ-hə̄uš Xša-θrā Ma-naŋ-hō (7 : 34.11.c).
Vaŋ-hə̄uš-cā dā-θə̄ng Ma-naŋ-hō (8 : 28.10.b).
Vaŋ-hə̄uš-cā vās-ta-rē < -trē > Ma-naŋ-hō (9 : 33.3.f).
Vaŋ-hə̄uš daz-dā Ma-naŋ-hō (7 : Y.c).
Vaŋ-hə̄uš pa(i)t-yās-təm Ma-naŋ-hō (8 : 53.3.c).
Vaŋ-hə̄uš P(a)ta-rəm Ma-naŋ-hō (7 : 31.8.c).
Vaŋ-hə̄uš pad(ə)-biš Ma-naŋ-hō (7 : 51.16.c).
Vaŋ-hə̄uš Fra-dax-ša-tā < -štā > Ma-naŋ-hō (7 : 31.17.f).
Vaŋ-hə̄uš fšən-ga < fšə̄ng > -hi-īm < -hīm > Ma-naŋ-hō (9 : 31.10.d). 1050
Vaŋ-hə̄uš Man-yə̄uš / šyao-θa-na-nąm ja-va-rō (11 : 48.8.d).
vaŋ-hə̄uš man-yə̄uš / +šyao-θna-hyā ux-δa-xə̄ā-cā (11 : 45.8.c).
Vaŋ-hə̄uš Man-yə̄uš / +šyao-θnāiš Maz-då A-hu-rō (45.5.e).
Vaŋ-hə̄uš raf(ə)-δrā-i Ma-naŋ-hō (8 : 54.1.c).
Vaŋ-hə̄uš vaz-dvar(ə̄) Ma-naŋ-hō (7 : 31.21.e).
Vaŋ-hə̄uš +šyao-θnā Ma-naŋ-hō (7 : 34.14.c).
Vaŋ-hə̄uš siž-dya-mnā Ma-naŋ-hō (8 : 32.4.d).
Vaŋ-hə̄uš x^{v}a-ē-ta-ə̄ng < -tə̄ng > Ma-naŋ-hō (9 : 34.12.f).

vaŋ < -hå > -hā-ō vī-dā-tā +rā-na-yå (9 : 31.19.f).
vaŋ-hu-yā a-šī +ga-tē (7 : 51.10.f). 1060
vaŋ-hu < -yā > -ya-ā +za-va-ō < -vō > -+ā-dā (9 : 33.12.d).
vaŋ-hu-yå cis-ṯōiš / / šyao-θa-nāiš Ā-ra < Ār > -ma(i)-tē (12 : 48.5.b).
vaŋ-hō Maz-då A-hu-rō vaē-θā (9 : Ye.b).
va-caŋ-hā vā aṯ vā ma-naŋ-hā (9 : 32.2.b).
va-cə̄ srū(i)-dyāi / hyaṯ mar(ə)-taē(i)-byō va-hiš-təm (11 : 45.5.b).
va-yū-bərə-du-byō duš-x^va-rə-θəm (9 : 53.6.d).
+var(ə)-cā-hī-+cā fra(i)-di-vā (7 : 32.14.c).
var(ə)-da(i)-tī Ā-ra < Ār > -ma(i)-tīš (7 : 28.3.e).
var(ə)-ma(i)-dī Hā nə̄ aŋ-haṯ (7 : 32.2.f).
Va-sə̄-xša-yąs / Maz-då dā-yāṯ A-hu-rō (11 : 43.1.b). 1070
Va-hiš-təm Θwā Va-hiš-tā (7 : 28.8.a).
va-hiš-təm yes-nē pa(i)-tī (7 : 51.22.b).
Va-hiš-tā i-ša-sā Ma-naŋ-hā (9 : 31.4.d).
va-hiš-tā īš-tiš srā-vī Za-ra-θuš-tra-hē (12 : 53.1.a).
va-hiš-tāṯ šyao-θa-nāṯ mar(ə)-tā-nō (9 : 32.12.b).
Va-hiš-tā ba-rə-tū Ma-naŋ-hā (9 : 33.9.d).
Va-hiš-tā vōis-tā Ma-naŋ-hā (8 : 32.6.d).
vah-māi dā(i)-dī sa-vaŋ-hō (7 : 51.2.f).
vah-mē Maz-dā ga-rō-bīš stū-tąm (9 : 34.2.f).
vāu-rōi-ma(i)-dī xra-fa < xraf > strā hiz-vā (9 : 28.5.f). 1080
vā-cəm nərəš a-sū-ra-hyā (7 : 29.9.c).
vās-trīm a-x́yā-i fšu-yaṉ-təm (8 : 31.10.b).
vās-tryāi-cā Θwō-rəš-tā ta-ta-šā (9 : 29.6.f).
vās < -tryāt > -tri-yāṯ vā ā-i-tē (7 : 31.9.e).
vās < -tryē > -tri-yē -hyā aē-naŋ-hō (7 : 31.15.e).
vās-tryō šyao-θa-nāiš ərə-švō (7 : 51.5.c).
vā-ziš-tō aŋ-ha(i)-tī a-sa < as > -tiš (9 : 31.22.f).
vī-ci-rō hąs / taṯ frō x^vaē-ta-vē mru-yāṯ (11 : 46.5.d).
vī-da-ąs < -dąs > vā θwax-šaŋ-hā Ga-vōi (9 : 33.3.d).
+vī-di-šəm-nāi ī-žā-cīṯ (7 : 51.1.c). 1090
vī-du-yē Vo-hū Ma-naŋ-hā (8 : 31.5.c).
vī-duš A-šā / yə̄m Maz-da-ąm < dąm > A-hu-rəm (11 : 45.8.d).
vī-du-šē zī nā mru-yāṯ (7 : 51.8.b).
vī-dyāṯ Sao-šyąs / ya-θā hōi a-šiš aŋ-haṯ (11 : 48.9.d).
vīd-vå a-vąm / yā īm aŋ-haṯ +a-pə-mā (11 : 44.19.e).
vīd-vå va-fūš vyā-na-yā (7 : 29.6.b).
vīd-vå vā ə-vīd-vå vā (7 : 31.12.c).
vīd-vå vī-du-šē mrao-tū (7 : 31.17.c).
Vī-vaŋ-hu-šō srā-vī Yi-mas-cīṯ (9 : 32.8.b).
Viš-tās-pā-i ī-šəm ma(i)-byā-cā (9 : 28.7.d). 1100
{vī-sō} šōi-θra-hyā [vā] dax́-yə̄uš [vā] (7 : 31.16.c).
vīs-pā' < -pā a > -yā-rə̄ / dar(ə)-gō-jyā-tə̄uš (u)rvā-daŋ-hā (11 : 43.2.e).

vīs-pāi ya-vē Vaŋ-həuš Ma-naŋ-hō (9 : 28.8.f).
vīs-pāiš Maz-dā Xšmā-va-sū sa-vō (9 : 34.3.f).
vīs-pā tā pərə-sās ya-θā (7 : 51.5.a).
{ vīs-pā tā yā / vā srū(i)-dyāi va-hiš-tā }* (11 : 46.15.b).
vīs-pəng an-yəng / man-yəuš spa-syā dvaē-šaŋ-hā (11 : 44.11.e).
vīs-pāŋ-hō da(i)-dyāi sa-vō (7 : 51.20.b).
+vīs-pås-+Tōi hu-jī-ta-yō (7 : 33.10.a).
vərən-tē Maz-dā / +yas-+Tē ciš-cā Spə-niš-tō (11 : 43.16.b). 1110
Vərə-z(ə)na-xyā-cā naz-diš-tąm dru-jəm (9 : 33.4.d).
vərəz-dāiš səng-hāiš / Sao-šyan-ta-ąm < -tąm > xra-ta-vō (11 : 46.3.c).
Vo-hū ux-šyā Ma-naŋ-hā (7 : 33.10.e).
Vo-hū Xša-θrəm Ma-naŋ-hā (7 : 51.21.d).
Vo-hū Xša-θrəm va(i)-ri-īm < -rīm > (7 : 51.1.a).
Vo-hū ga(i)-dī Ma-naŋ-hā (7 : 28.6.a).
Vo-hū da-dē ha-θrā Ma-naŋ-hā (9 : 28.4.b).
Vo-hū Ma-naŋ-hā fə-sə-ra-tūm (9 : 33.12.f).
Vo-hū Ma-naŋ-hā +vōi-vī-dā(i)-tē (9 : 30.8.d).
Vo-hū hu-o < hvō > Xša-θra-ā < -θrā > (7 : 31.22.c). 1120

š

šōi-θrəm vā dax-yūm vā ā-dāt (9 : 34.18.d).
šyao-θa-na-nąm aŋ-həuš Maz-dāi (9 : Y.d).
šyao-θa-na-hyā A-šāi-+cā (7 : 33.14.e).
šyao-θa-nāiš x^{v}āiš Da-ē-nā naē-šāt (9 : 31.20.f).
+šyao-θnāi Maz-dā ya-θā +Vå +hax-mī (9 : 34.5.b).
+šyao-θnāiš A-šā / Θwa-hyā Maz-dā səng-ha-hyā (11 : 48.12.c).
+šyao-θnāiš Maz-dā Va-hiš-təm (7 : 51.1.e).
+šyao-θnōi Spən-təm / A-hu-rəm A-ša-va-nəm (11 : 46.9.c).
+šyao-θnōi-+cā hī +Va-hyō-+A-kəm (8 : 30.3.d).
šyao-mąm a(i)-pī da(i)-bi-tā-nā (7 : 32.3.e). 1130
šye(i)-tī-byō vī-zi-byō i-ra-tū [iš] du-vaf < dvaf > -šō (12 : 53.8.e).

s

Sao-šyan-tō Dəng / Pa-tōiš Spən-tā Da-ē-nā (11 : 45.11.d).
sa-rəm tat Θwā / Maz-dā yā-sā A-hu-rā (11 : 49.8.b).
sa-rōi būž-dyāi / +Ha(u)r-vā-tā-+A-mərə tā-tā (11 : 44.17.d).
sa-va-yō a-ša-va-nəm (7 : 51.9.f).
+sa-vā-cā a-ša-va-byō (7 : 30.11.e).
S(ə)rao-šəm Ma-za < Maz > -dā-i (7 : 28.5.d).
S(ə)rao-šəm za-ba < zba > -yā a-vaŋ-hā-nē (2 : 33.5.b).
S(ə)rao-šō a-šī / mą-zā-ra-yā ha-ci-mnō (11 : 43.12.d).
+sā-drā +mōi sąs / maš-yaē-šū za-raz-dāi-tiš (11 : 43.11.d). 1140

* There is one line missing from the Text in Yas. 46.15. This has been noted even from the days of the Pahlavi writers. As each verse of Gāθā Uštavaiti consists of five lines, I have tried here to supply the whole of this missing line.

sâ-rə-ma-nō < -mnō > Vo-hū Ma-naŋ-hā (9 : 32.2.b).
sā-x^və̄-nī·vaz-ya-mnā-byō. ka-(i)-ni-byō mrao-mī (12 : 53.5.a).
sə̄ṉg-huš raē-x(ə)nå a-spə̄ṉ [-ciṯ] sā-drā-ciṯ (9 : 34.7.c).:
sī-šā nå +A-šā-+pa-θō (7 : 34.12.e).
stao-tā-cā A-hu-rā-i (7 : 30.1.c).
sta-vas A-šā / Yə̄ Hu-dā-ō < -då > Yōi hən-tī (11 : 45.6.b).
stōi ra-paṉ-tē ci-θrā-a-vaŋ-həm (9 : 34.4.d).
spəṉ-ta-ḱyā-cā nərəš +šyao-θnā (7 : 34.2.c).
Spəṉ-təm aṯ Θwā / Maz-dā mə̄ṉg-hī A-hu-rā (11 : 43.5.a).
" " " " " " (11 : 43.7.a). 1150
" " " " " " (11 : 43.9.a).
" " " " " " (11 : 43.11.a).
" " " " " " (11 : 43.13.a).
" " " " " " (11 : 43.15.a).
Spəṉ-tā Ma(i)n-yū / Va-hiš-tā-cā Ma-naŋ-hā (11 : 47.1.a).
Spəṉ-tā Ma(i)n-yū / vīs-pa-na-ą̄m < -ną̄m > Dā-tā-rəm (11 : 44.7.e).
Spəṉ-tā Ma(i)n-yū / srao-tū Maz-då A-hu-rō (11 : 45.6.c).
Spəṉ-tą̄m-cā Ā-ra < Ār > -ma(i)-tīm (7 : 34.10.c).
Spəṉ-tą̄m və̄ Ā-ra < Ār > -ma(i)-tīm vaŋ-hvīm < vaŋuhīm· > (9 : 32.2.e)
Spəṉ-tō Maz-då A-hu-rō (7 : 51.16.e). 1160
Spəṉ-tō Vīd-vå / yaē-ciṯ +Gūz-rā-+Sə̄ṉg-håŋ-hō (11 : 48.3.c).
spə̄-niš-tā Ā-ra < Ār > -ma-tōiš +hu-dā-nū +var(ə)-švā (12 : 53.3.f).
Spə̄-niš-tā Ma(i)n-yū Maz-dā (7 : 33.12.c).
" " " (7 : 51.7.d).
Spi-tā-ma-hi-ā < -hyā > ye-zī Hōi dāṯ ā-yap-tā (12.53.1.b).
Spi-tā-mā Ah-māi daz-dē (7 : 51.19.b).
Spi-tā-mī +yez-vī dug(ə)-drą̄m Za-ra-θuš-tra-hē (12 : 53.3.b).
Spi-tā-mō +F(ə)ra-šaoš-traš-cā (7 : 53.2.d).
srao-tā gə̄uš-āiš va-hiš-tā (7 : 30.2.a).
srao-tā mōi mərəz-dā-tā mōi (7 : 33.11.e). 1170
srao-tū A-šā / gū-ša-hvā Tū A-hu-rā (11 : 49.7.b).
srao-tū sās-nå / fšə̄ṉg-hi-yō < -hyō > sū-yē taš-tō (11 : 49.9.a).
sra-vås-cā šyao-θa-nā-cā vao-cā (9 : 34.15.b).
+srā-va-ye(i)-tē ye-zī tāiš a-θā (9 : 32.6.b).
srū(i)-dyāi Maz-dā +frā-+vao-cā (7 : 34.12.c).

z

Za-ra-θuš-trəm Spi-tā-məm (7 : 51.12.c).
Za-ra-θuš-trā / kas-tē' < -tē a > -ša-vā ur-va-θō (11 : 46.14.a).
Za-ra-θuš-trāi ao-jōṉg-hvaṯ raf(ə)-nō (9 : 28.6.d).
Za-ra-θuš-trāi / kaṯ Tōi Vo-hū Ma-naŋ-hā (11 : 49.12.b).
Za-ra-θuš-trāi nā Maz-dā (7 : 51.11.b). 1180
Za-ra-θuš-trāi / hyaṯ vas-nā f(ə)ra-šō-tə-məm (11 : 46.19.b).
Za-ra-θuš-trō Spi-tā-mō (7 : 29.8.c).
+zas-tā-+iš-tāiš +dərəš-tā-+aē-naŋ-həm (9 : 34.4.f).

⁺zas-tā-⁺iš-tā / yā nā̊ xu-ā < x^{v}ā > -θrē dā-yat̲ (11 : 50.5.d).
zas-tāiš frī-nəm-nā ⁺A-hu-ra-hyā (9 : 29.5.b).
zas-tōi-byā vā var(ə)-ša(i)-tī (7 : 33.2.c).
za-x́yā-cā vīs-pā-oη < -pā̊η > -hō xrao-sən̲-tą̄m u-pā (12 : 53.8.b).
zdī nə Maz-dā A-hu-rā (7 : 31.17.e).

h

ha(i)-θīm A-ša-hyā Dą̄-mīm (7 : 31.8.e).
ha(i)-θyāiš šyao-θa-nāiš frao-rət̲ Maz-dą̄m (9 : 30.5.f). 1190
ha(i)-θyā-var(ə)š-tą̄m / hyat̲ vas-nā f(ə)ra-šō-tə-məm (11 : 50.11.d)
⁺ha(i)-θyən̲g ⁺ā ⁺stīš / yən̲g ā šaē-tī A-hu-rō (11 : 43.3.d).
⁺ha(i)-θyō-⁺dvaē-šā̊ / hyat̲ i-šō-yā drəg-vāi-tē (11 : 43.8.b).
⁺Ha-ur-va-tō-⁺A-mərə-tā-tas-cā (9 : 31.21.b).
Haē-cat̲-as-pā / vax-šyā və ⁺Spi-tā-mā̊η-hō (11 : 46.15.a).
ha-cā A-šāt̲ / ⁺šyao-θnā-cā va-caη-hā-cā (11 : 47.1.b).
ha-d(ə)mōi A-šā / Vo-hū-cā syą̄s Ma-naη-hā (11 : 44.9.e).
ha-dā A-šā / Va-hiš-tā-cā Ma-naη-hā (11 : 50.4.b).
ha-dā vās-trā gao-dā-yō θwax-šō (9 : 29.2.d).
ha-dā ⁺və-⁺stā / vah-mən̲g S(ə)rao-šā rā-daη-hō (11 : 46.17.c). 1200
⁺ha-nar Θwah-māt̲ / zao-šāt̲ drəg-vā̊ bax-ša(i)-tī (11 : 47.5.c).
ha-məm tat̲ Va-hiš-tā-cit̲ (7 : 32.16.a).
Hā-tā-Ma-rā-nē A-hu-rā (8 : 32.6.c).
hā-tą̄m hu-ō < hvō > ao-jiš-tō (7 : 29.3.e).
Hā-rō ma(i)n-yū / ⁺A-hūm-⁺Bīš Ūr-va-θō Maz-dā (12 : 44.2.e).
hā zī aη-hōuš / vaη-hvī < vaηuhī > vis-tā ā-kərə-tiš (11 : 48.2.d).
Hā [zī] nə hu-šōi-θ(ə)mā / / Hā nə u-ta-yū(i)-tīm (11 : 48.6.a).
Hā zī pou-ruš / i-šən̲-tō vāu-rā-i-tē (11 : 47.6.d).
hą̄s hu-xra-tuš nə-maη-hā (7 : 51.5.d).
hiz-vā ux-δāiš / Vaη-hōuš (əə)ā-nū Ma-naη-hō (11 : 47.2.b). 1210
hiz-vā Θwa-hyā ā-oη < -ā̊η > -hō (7 : 31.3.c).
hu-xša-θrā xšən̲-tą̄m / / mā nə duš(ə)-xša-θrā xšən̲-tā (12 : 48.5.a).
hu-xša-θrāiš ⁺jə-⁺nə-ra-ą̄m < -rą̄m > [xrūnərą̄m-cā] (7 : 53.8.c).
Hu-jī-ā < -jyā > -tōiš A-mərə-tā-tas-cą̄ (9 : 32.5.b).
hu-mą̄z-drā ⁺A-šā-i-⁺cā (7 : 30.1.e).
hyat̲ a(i)-bi-g(ə)mən / ya-θrā Cin-va-tō-Pərə-tuš (11 : 46.11.d).
hyat̲ aē-naη-hē drəg-va-tō (7 : 32.16.e).
hyat̲ a-kō-yā drəg-vāi-tē (7 : 51.8.c).
hyat̲ [as] ⁺ao-jā̊ nā(i)-di-ā̊η < -dyā̊η > -həm (7 : 34.8.c).
hyat̲ ast-van̲-təm da-dā̊ uš-ta-nəm (9 : 31.11.d). 1220
hyat̲ ah-mī (u)rū-raost aš-tō (7 : 51.12.d).
hyat̲ a-x́yāi da-dā-ō < -dā̊ > pa-θa-ām < θą̄m > (9 : 31.9.d).
hyat̲ ⁺ā ⁺būš-tiš / ⁺Va-sas(ə)-⁺Xša-θra-hyā di-ā < dyā > (11 : 43.8.d).
hyat̲ ą̄-sa-šu-tā / / yā da(i)bi-tā-nā fra-ox-tā (12 : 48.1.b).
hyat̲ īš ⁺ā ⁺Də-ba-o-mā (7 : 30.6.b).
hyat̲ (u)rva-təm ⁺caz-dōn̲gh-vad(ə)-byō (7 : 31.3.c).

hyat̲ us A-šā / nap-tyaē-šu -{ cā } naf-šū-cā (11 : 46.12.a).
hyat̲ Xšmā ux-δaiš / dī-da-iŋ-hē pao-ur-vīm (11 : 43.11.c).
hyat̲-cā Gāuš ja(i)-dyāi mrao-ī (7 : 32.14.e).
hyat̲-cā dar(ə)-gəm drəg-vō-d(ə)byō ra-šō (9 : 30.11.d). 1230
hyat̲-cā mōi mraoš / A-šəm ja-sō frā-xšnə-nē (11 : 43.12.a).
hyat̲ ci-vīš-tā +hu-dā̊-byō (7 : 34.13.e).
hyat̲ tā (u)rvā-tā sa-ša-θā (7 : 30.11.a).
hyat̲ tā zas-tā / yā +Ta-vā haf-šī a-vā̊ (11 : 43.4.b).
hyat̲ Θwā aŋ-hə̄uš / zą-θōi dar(ə)-səm +Po-ur-vīm (11 : 45.5.b).
hyat̲ Θwā Xša-θrā / A-šāt̲ ha-cā +frā-ą̄s < frą̄s > -tā (11 : 43.14.e).
hyat̲ Θwā xša-yą̄s / aē-šəm dyāt̲ ə̄-ma-van̲-təm (11 : 43.10.e).
hyat̲ < Θwā > Θu-ā [hə̄m] caš-ma(i)-nī hə̄n̲-gra-bəm (9 : 31.8.d).
hyat̲ Da-ē-nā̊ / +pou-ru-yā̊ dā̊ A-hu-rā (11 : 46.6.e).
hyat̲ Da-ē-nā̊ / va-hiš-tē yū-jə̄n mīž-dē (11 : 49.9.c). 1240
hyat̲ dā-θa-ə̄ng < -θə̄ng > / vī-ca-ya-θā' < -θā a > -dā-θą̄s-cā (11 : 46.15.c).
hyat̲ dā̊ +šyao-θnā / mīž-da-vą̄n yā-cā ux-δā (11 : 43.5.c).
hyat̲ Nā fri-yāi < fryāi > / vaē-də-mnō I-svā da(i)-dīt̲ (11 : 43.14.a).
hyat̲ nə̄ Maz-dā pao-ur-vīm (7 : 31.11.a).
hyat̲ Maz-dā ra-pə̄n Ta-vā (7 : 51.18.f).
hyat̲ Maz-dą̄m du-vai < dvai > -dī +f(ə)ra-sā̊-byō (9 : 29.5.d).
hyat̲ mā drəg-vā̊ / dī-dar(ə)-ša-tā +aē-naŋ-hə̄ (11 : 46.7.b).
hyat̲ mā Vo-hū / pa(i)-rī-ja-sat̲ Ma-naŋ-hā (11 : 43.7.b).
,, ,, ,, / ,, ,, (11 : 43.9.b).
,, ,, ,, / ,, ,, (11 : 43.11.b). 1250
,, ,, ,, / ,, ,, (11 : 43.13.b).
,, ,, ,, / ,, ,, (11 : 43.15.b).
hyat̲ mīž-dəm Za-ra-θuš-trō (7 : 51.15.a).
hyat̲ mōi' < mōi a > -pi-va(i)-tī / / +Ha(u)r-vā-tā-+A-mərə-tā-tā (12 : 44.18.d).
hyat̲ mōi A-šā dā-tā va-hi-yō < -hyō > (9 : 31.5.b).
hyat̲ mōi Vaŋ-hə̄uš / ha-zə̄ ji-mat̲ Ma-naŋ-hō (11 : 43.4.e).
hyat̲ Yūš-mā-kāi / mą-θrā-nē vao-rā-za-θā (11 : 50.5.b).
hyat̲ vā̊ a-kā ma-naŋ-hā (7 : 32.5.c).
hyat̲ vī-sən̲-tā drəg-van̲-təm a-vō (9 : 32.14.d).
hyat̲ vərə-nā-tā A-ciš-təm Ma-nō (9 : 30.6.d). 1260
hyat̲ +šyao-θnā-cā sə̄n̲g-hą̄s-cā (7 : 31.11.c).
hyat̲ +ha-θrā-+ma-nā̊ ba-vat̲ (9 : 30.9.c).
hyat̲ hə̄m Vo-hū / Maz-dā +fraš-tā Ma-naŋ-hā (11 : 47.3.d).
hyat̲ hə̄m spā-dā / an-ao-caŋ-hā ja-maē-tē (11 : 44.15.c).
hyat̲ hīm dā-tā xša-yan̲-tō (7 : 29.2.c).
hyat̲ Hōi A-šā / Vo-hū-cā cōišt Ma-naŋ-hā (11 : 45.10.c).
hyat̲ hōi īm ca-ra-tas-cā (7 : 51.12.e).
hyat̲ hōi Vo-hū vax-šat̲ Ma-naŋ-hā (9 : 31.6.f).
hyat̲ hōi hu-d(ə)mən da-yāi < dyāi > vax(ə)-δrą-hyā (9 : 29.8.f).
hvō a-ša-vā / yah-māi a-ša-vā fri-yō < fryō > (11 : 46.6.d). 1270
[hvō] +u-ru-saē(i)-byō Spən̲-tō sas-na-yā (9 : 29.7.d).

Hvō xra-θwā Dą̄-miš A-šəm (7 : 31.7.c).
< Hvō > Hu-ō-gvā tāiš / yə̄ng us-va-hī +uš-tā +stōi (11 : 46.16.b).
< Hvō > Hu-ō-gvō iš-tōiš x^{v}ar(ə)-nā̊ (7 : 51. 18.b).
< Hvō > Hu-ō-gvō daē-dōišt +kəhr-pəm (7 : 51.17.b).
hvō ji-ā < jyā > -tə̄uš sə̄ng-ha-nāiš xra-tūm (9 : 32.9.b).
hvō tat nā Ma(i)-dyōi-Mā̊ŋ-hā (7 : 51.19.a).
hvō tə̄ng frō-gā̊ / paθ-mə̄ng +Hū-+Cis-tōiš ca-rāt (11 : 46.4.e).
hvō Tōi Maz-dā A-hu-rā (7 : 31.22.e).
hvō Da-ē-nąm / +šyao-θnā-cā va-caŋ-hā-cā (11 : 48.4.b). 1280
hvō dā-mōiš +Dru-jō hu-nuš (7 : 51.10.c).
Hvō Dərə-zā Mərə-θyāuš Ma-ziš-tō mo-šū cā's < cā as > -tū (12 : 53.8.f).
hvō [nə̄] Maz-dā vaš-tī A-šā-i-cā (9 : 29.8.d).
hvō Man-yə̄uš ā Va-hiš-tāt ka-yā (9 : 33.6.b).
hvō mā nā sra-vā̊ mōr(ə)n-dat (7 : 32.10.a).
Hvō: Vī-ci-rō A-hu-rō (7 : 29.4.e).
hvō zī A-šā / spə̄n-tō (I)rix-təm vīs-pōi-byō (11 : 44.2.d).
hvō zī drəg-vā̊ / yə̄ drəg-vāi-tē va-hiš-tō (11 : 46.6.c).
hvō zī Mą̄-θrā ši-ā < šyā > -tō (7 : 51.8.e).

x^v

+x^{v}a(i)-θyā-cā Maz-da-ā < -dā > dar(ə)-šat-cā (9 : 33.7.b). 1290
X^{v}aē-tə̄uš-cā +ta-rə-+ma(i)-tīm (7 : 33.4.c).
X^{v}aē-tū vā at vā Vərə-zə̄-ni-yō < -nyō > (9 : 33.2.b).
x^{v}a-ra(i)-θyā va(i)n-tyā sra-vā̊ (7 : 28.10.f).
x^{v}a-rə-θāi ā A-mərə-ta-tā̊s-cā (9 : 34.11.b).
x^{v}āiš šyao-θa-nāiš sə̄ng-hāiš-cā (7 : 51.14.d).
x^{v}āiš šyao-θa-nāiš hiz-vas-cā (7 : 51.15.e).
x^{v}āiš hi-zu-biš / fšu-ya-sū a-fšu-yan-tō (11 : 49.4.b).
< x^{v}ā > xu-ā-θrā maē-θā ma-yā (7 : 33.9.c).
< x^{v}ā > xu-ā-θrō-yā / nā xu-ā < x ā > -θrəm da(i)-dī-tā (11 : 43.2.b).
+x ā-+pa(i)-θyāt Xša-θra-hi-ā < -hyā > sa-rō (9 : 31.21.d). 1300
< +x^{v}ə̄ng > xu-ə̄ng-+dar(ə)-sōi / Xša-θroi xyāt Ā-ra < Ār > -ma(i)-tiš (11:43.16.d).
< +x^{v}ī > xu-i-tī+-cā+-+ə-nə(i)-tī (7 : 30.11.d). 1302

These 1302 entries of the Metrical Index are made up as under:

Yaθā	1 verse	6 *pādas*.
Ašəm	1 verse	2 lines.
Yeŋhe	1 verse	4 lines.
Yānīm	1 verse	4 lines.
Gāθā Ahunavaiti	100 verses	600 *pādas*.
,, Uštavaiti	66 verses	330 lines.
,, Spəntā-Mainyu	41 verses	164 lines.
,, Vohū-Xšaθra	22 verses	132 *pādas*.
,, Vahištā-Išti	9 verses	54 *pādas*.
Airyə̄mā Išyō	1 verse	6 *pādas*.

Total 243 verses consisting in all of 1302 *pādas* and lines.

A NOTE ON THE DIALECT OF KAYAVAR*

By

A. C. SEKHAR

Kayavar (also known as Vēṭans) are a class of backward people who live in small groups in Central Travancore. They eke out a livelihood by working as day labourers and by hunting. Until recently they lived a nomadic life, but now they are settled in villages not far from the hills on the eastern border of Travancore. Their new type of life brings them into contact with civilization more than ever before and their speech habits are becoming affected by the surrounding Malayāḷam dialects at a very rapid rate. I came across only one Kayavar boy who had been to school, and it is extremely unlikely that any one among the older people has had any kind of schooling. This boy talked 'good' Malayāḷam and told me that he could not speak the traditional dialect (māmūlanusaricca bhāṣā) of his group. There is a distinct break between the speech of the younger generation and that of the older; the former do not use many of the words and expressions current among the older people.

The older generation of Kayavar speak a dialect which is of great interest to the student of Dravidian linguistics. This dialect may very well be considered as a dialect of Tamil, and it appears to preserve some characteristic features of the older form of that language. I met the Kayavar for the first time in the Kuḷattuppuḷa area on May 19, 1948. Since I could not spend much time with them and since most of the adult members of the group had gone out for work the material I could gather was very scanty indeed. The following features in the material are noteworthy :—

I. Phonology :

(a) Tendency to end words in a vowel : examples—*accai* (besides *accan*), *makai* (cf. Tamil—Mal *makan*), *avaru*, *polikkōlu*, *koṭuvaḷu*, *nāttuvai* (beside *nāttuvan*).

(b) Initial *n* and *ñ* are in free alternation : *nāṅkaḷ* and *ñāṅkaḷ* (we).

* I take this opportunity to thank Professor C. R. SANKARAN, Reader in Dravidian Linguistics and in charge of the Phonetics Laboratory at the Deccan College Research Institute, Poona, Dr. S. M. KATRE, the Director and Professor of Indo European Linguistics at the Deccan College Research Institute, and the Forest Department of the Government of Travancore for having given me the facilities for making a beginning in my study of the 'hill dialects' of Kēraḷa, in the course of which work I came upon the Kayavar dialect.]

(c) *ṅk, ṅṅ, ñc, ññ* alternate : *aṅkeṭṭō iṅkeṭṭō* (hither or thither), *iṅṅōṭṭu* (hither), *iñce bāji* (come here), *iññāṭu vā* (come here).

(d) *b* and *v* alternate : *bā, vā* (come).

(e) the use of the voiced alveolar plosive combination *nḏ* is the most interesting feature of the phonology : *nikkunḏu* (she stands), *tinninḏu* (I eat), *ānḏu* (is), *ānḏō* (is that so ?), *oraṅkinḏu* (he sleeps). It is noteworthy that the younger generation tends to use *n/ṅ* or *ṇ* in the place of this *nḏ* ; for example, *ānu* or *āṇu* instead of the older *ānḏu*.

II. Morphology :

(a) *nāṅkaḷ* / *ñāṅkaḷ* (we), *ninakku* (to you).

(b) *avvu* (there), *ivvu* (here).

(c) Personal terminations for verbs do not seem to be in common use [see I. (e) above for examples].

III. Vocabulary :

accai (father) (also *appan*), *ammacci* (mother), *puḷḷai* (child), *makai* (son), *makaḷ* (daughter), *appacci* (father's mother), *valiyammacci* (mother's mother) (new *valiyamma*), *ammattai* (father's father) (new *valiyaccan*), *ant–e* (*-ai*) (father-in-law), *ammāvi* (mother-in-law), *nāttu-van* (*-vai*) (husband's sister); *peḷe* (door), *polikkōlu* (broom), *paṭuppu* (mat), *vāṇiyappuṭṭe* (pan bag) ; *paṭ–* (to perish).

IV. Sentence types :

(a) Affirmative : *sasyaṅṅaḷellām paṭṭu pōvum* (All the plants will perish.) ; *avaru keṭantu oraṅkuya* (*oraṅkinḏu*) (He is sleeping ; literally, He, having laid himself down, is sleeping) ; *bā, nākkellām aṅkvōvām* (Come, let us all go there.) ; *iviṭeruntu tavutāriccā pōrum* (It is enough if we stay here and speak).

(b) Imperative : *vāṇiyappuṭṭe iññaṭu eddōji* (Bring the pan-supāri bag here) ; *ṅkuḷu pōyi vittu mēṭiccōṇṭu varī* (You please go and buy the seeds and come.) ; *pēnātti eṅkeṭā ?* (Where is the knife ?—to a boy.) ; *ennuttukkāji ūriyatu tākkōlu ?* (Why did you take out the key ?—to a girl) ; *appan eppam varumī* (When will father come ?).

[There are no examples for other types of sentences in my materials.]

THE KINSHIP SYSTEM AND KINSHIP TERMS IN KARNATAK

By

I. KARVE

In the following paper I have recorded kinship terms and usages prevalent in Karnatak and discussed certain social relationships revealed by them. The terms given here were gathered personally by me during the course of my field work in Karnatak. Some of these terms were supplied to me by my pupil Mr. RAMAN UNNI and others were collected from the Kannada-English school dictionary (The Shala nighantu) by Rev. J. BUCHER.

This last book contains many purely sanskrit words like 'anuja' younger brother, 'jestha' elder brother, 'janani' mother, which have not been included in the list given below. They are not generally used in the spoken language. They are however not quite unimportant as they appear again in modified form in Malayalam terminology as jetati or anujati. The borrowed terms and the new forms and shades of meanings they acquire cast much light on the kinship-terms of a linguistic province and must be carefully studied with the help of its folk-literature and written literature. The kinship terms and usages must be recorded for the various castes and sub-castes as also for sub-regions of a linguistic area. The present article is written without fulfilling either of the above requirements. The inability to speak or to read Kannaḍa hampers the writer from collecting data from literature as also from all major castes without help. Below is given the terminology and usages collected and it is hoped that the gaps will be filled in, and mistakes committed in interpretation will be corrected by friends and colleagues in Karnatak. It was in fact their wish which has hastened the writing of this short sketch.

Consanguine Relations.

A. Ascendents.

1.	Father.	Tande, Appa, Tata.
2.	Father's father.	Ajja, Tata.
3.	Father's father's father.	Muttata, Muttajja, Muttayya.
4.	Father's mother (wife of 2).	Ajji.
5.	Father's father's mother (wife of 3).	Muttajji.
6.	Mother.	Tayi, Amma, Avva, Abbe.
7.	Mother's father.	Ajja, Ayya.
8.	Mother's father's father.	Muttaja, Muttayya.
9.	Mother's mother (wife of 7).	Amma, Ajji.
10.	Mother's father's mother (wife of 8).	Muttamma.

11.	Father's brother—Younger.	Kakka, Chikkappa.
	Elder.	Doddappa.
12.	Mother's brother.	Mava.
13.	Father's sister.	Sodar atte.
14.	Mother's sister—Younger.	Chikkavva, Chikkamma.
	Elder.	Doddavva, Doddamma.

B. Collateral Relations.

15.	Brother—Younger.	Tamma.
	Elder.	Anna.
16.	Sister—Younger.	Tangi.
	Elder.	Akka.
17.	Father's brother's son—Younger.	Tamma.
	Elder.	Anna.
18.	Father's brother's daughter—Younger.	Tangi.
	Elder.	Akka.
19.	Father's sister's son—Younger.	Bhava-Maida or simply Maida.
	Elder.	Bhava.
20.	Father's sister's daughter—Younger.	Nadini.
	Elder.	Attige.
21.	Mother's brother's son— Younger.	Maiduna.
	Elder.	Bhava, Maida.
22.	Mother's brother's daughter—Younger.	Nadini.
	Elder.	Attige.
23.	Mother's sister's son— Younger.	Tamma.
	Elder.	Anna.
24.	Mother's sister's daughter—Younger.	Tangi.
	Elder.	Akka.

C. Descendents.

25.	Son.	Magana, Maga.
26.	Daughter.	Magalu.
27.	Son's son.	Mommaga.
28.	Daughter's son.	,,
29.	Son's daughter.	Mommagalu.
30.	Daughter's daughter.	,,
31.	Son's son's son.	Kiri maga.
32.	Son's son's daughter.	Kiri magalu.
33.	Daughter's son's son.	Kiri maga.
	,, ,, daughter.	Kiri magalu.
34.	Brother's son (man speaking).	Maga.
	,, daughter (man speaking).	Magalu.
35.	Brother's son (woman speaking).	Aliya.
	,, daughter (woman speaking).	Sose.
36.	Sister's son (man speaking).	Aliya.
	Sister's daughter (man speaking).	Sose.

37. Sister's son (woman speaking).	Maga.
,, daughter (woman speaking)	Magalu,

Affinal Relations.

A. Ascendents.

38. Husband's father.	Mava.
39. ,, mother.	Atte.
40. Wife's father.	Mava.
41. ,, mother.	Atte.
42. Husband's uncles.	Mava.
43. ,, aunts.	Atte.
44. Wife's uncles.	Mava.
45. ,, aunts.	Atte.
46. Husband's grand parents.	Ajja.—Ajji.
47. Wife's ,, ,,	Ajja.—Ajji.

B. Collateral.

48. Husband.	Ganda.
49. Husband's brother.	Maida, Maiduna. Bhava.
50. Husband's sister.	Nadini. Attige, Chikkavva, Chikkamma.
51. Husband's brother's wife.	Warigitti.
Younger ,, ,,	Tangi.
Elder ,, ,,	Akka.
52. Husband's sister's husband—Younger	Tamma.
Elder	Anna, Chikkappa.
53. Wife.	Hendati.
54. Wife's brother—Younger.	Bhava maida.
Elder.	Bhava.
55. Wife's sister— Younger.	Nadini.
Elder.	Attige.
56. Wife's brother's wife— Younger.	Tangai.
Elder.	Akka.
57. Wife's sister's husband—Younger.	Shaddaga.
Elder.	,,
58. Brother's wife (man speaking)—	
Younger.	Nadini.
Elder.	Attige.
59. Brother's wife (woman speaking)—	
Younger.	Nadini.
Elder.	Attige.
60. Sister's husband (man speaking)—	
Younger.	Maida.
Elder,	Bhava.

61.	Sister's husband (woman speaking)—	
	Younger.	Maida.
	Elder.	Bhava.
62.	Son's wife's father.	Beega.
	,, ,, mother.	Akka, Tangai.
63.	Daughter's husband's father.	Beega.
	,, ,, mother.	Akka, Tangai.

C. Descendants.

64.	Son's wife.	Sose.
65.	Daughter's husband.	Aliya.

Miscellaneous.

66.	Father's second wife (step mother).	Mala tayi.
67.	Mother's second husband (step father).	Malatande.
68.	Co-wife.	Savate.
69.	Step brother (having same mother but different father).	Malatandeya maga.
70.	Step brother (having same father but different mother).	Malatayu magalu.
71.	Step sister.	Malatandeya Magalu.
72.	,, ,,	Malatayi Magalu.
73.	Step son (woman speaking).	Mala Maga.
74.	,, ,, (man speaking).	,, ,,
5.	,, daughter (woman speaking).	Dhare, Mala Magalu.
76.	,, ,, (man speaking).	,, ,, ,,
	First marriage of a woman.	Maduve.
	,, ,, ,, a man.	,,
	Widow marriage.	Udike, Koodike.
	Widower marriage.	,, ,,
	Divorce.	Seragu hariyadu.
	Widow.	Munde, Bole, Gandan kollu (one who has killed her husband).
	Widower.	Hendati Sattava.

When compared with the terminologies of the northern languages this pattern discloses some very striking differences. These are :—

1. *There are no generic terms for brothers or sisters.*—The word *sahodara* obviously borrowed from Sanskrit is sometimes used but there seems to be no original Kannada word having the connotation of sibling or brother or sister. The terms invariably used are those for elder brother and younger brother (Anna, Tamma), elder sister and younger sister (Akka, Tangi). To dismiss the peculiarity as a defect of the language is to miss its real significance. A language reflects living social usages or is a reflection of certain historical processes. The emphasis

on the relative ages of the siblings must have its roots in some social function not found in northern societies. We shall discuss it later.

2. *There is no affinal terminology in this language.*—In Sanskrit and in the modern Indo-Aryan languages derived from Sanskrit, there is a complete set of terms for relations by marriage which are entirely different from those for blood-relations. In the present sample all the terms used for affinal relations are also used for relations by blood. Thus the term Mava, Atte, Aliya, Sose, Bhava or Bhava maiduna are used for maternal uncle, paternal aunt, nephew, niece, and cross-cousin as also for father-in-law, mother-in-law, son-in-law, daughter-in-law, and brother-in-law respectively. This is due to the fact that cross-cousin marriage is the preferred type of mating in this region, so that the relations by marriage are relations by blood, i.e., cross-cousins, aunts, uncles and nephews before they enter into marriage. One would expect that words for husband and wife would also not be independent kinship terms and it does appear to be the case with regard to the words *Ganda* and *Hendati*. The words Heṇ and Hend mean a woman even in modern times. Hend is also used for wife and Hendati appears to be an extended form of Hend or Heṇ. In the same way the word Ganda meant a man or a brave. Hen makkalu means women folk and Gandsu means a male person. In Sanskrit the words Purusa and Stree are similarly used for husband and wife but the original meaning man and woman is never lost, the more frequent kinship terms being Pati and Patni or Jaya. Every Purusa is not necessarily a Pati, nor is every Stree (woman) a Patni or Jaya. This difference in the two terminologies may well be due to a difference in social organisation of which cross-cousin marriage is but one feature—the one society i.e. of the sanskrit-speaking people choosing to get women from outside the consanguinous family group, while the other the Kannada-speaking group (the Dravidian speaking group) choosing to marry only very near relations. The former system has always drawn into the family relationship newer and stranger elements. It also tends to keep alive the rivalries between the father's or mother's house on the one hand and the husband's or wife's house on the other. The relation between these two is always a very complicated affair and marriages contracted for the sake of an alliance of two families not seldom end in bitter feuds. The folk songs of the north are heavy with the grief of women who must give up the childhood's home to enter that of complete strangers. The ancient legends and folk-tales tell of rivalry and power politics of the women—the wives of different men in a household—brought from quite distinct families and living in a common household as mothers-in-law, daughters-in-law, and sisters-in-law (wives of brothers). This kinship system though involving great suffering to the women makes for expansion and extension of kin-groups. The kannada system, on the other

hand, stands for strengthening and consolidating the already existing kin-group. The in-law relations or future husband and wife are known to each other as blood-relations and marriage but intensifies these bonds. Though the pattern is patrilocal and patriarchal and a woman goes to live with the husband's people, the separation from the father's house is not felt bitterly as she is with her own uncles and aunts.

3. The kinship terms fit not only a family with cross-cousin marriage but suggest a dual system so that the wife of the maternal uncle has the same term as that for father's sisters and mother-in-law. The terms for father's brother and mother's sister's husband are identical. Two families exchange daughters and the so-called classificatory terminology suggesting a dual system in a whole tribe arises. The dual system is not a system arising out of a division of a tribe into two, but out of a custom of two families exchanging daughters.

A complete lack of affinal terms, and the same individuals being connected in different ways has reduced the number of kinship terms in Kannada. The groups of terms represented by blood relations on the one hand and affinal relations on the other in the Indo-Aryan languages are represented here in the two sets of terms applied to own parents, siblings and parallel cousins on the one hand and maternal-uncle, paternal-aunt and cross-cousins on the other.

The terms give us a separate set each for three generations but not beyond. The terms for grand-father or grand-mother are the same whether they are father's ancestors or mother's ancestors. In the father's generation, father and father's brother, mother's sister's husband, mother, mother's sister and father's wife are grouped together while mother's brother, father's sister's husband and father's sister and mother's brother's wife are grouped together. There are thus terms for father (big father, little father) and mother on the one hand (they include parents of parallel cousins) and for 'Uncle' and 'Aunt' (mother's brother and father's sister) on the other (parents of cross-cousins). The same distinction is carried in ego's generation; the terms brother and sister stand for parallel cousins, while Bhava-maiduna, Attige and Nadini are used for male and female cross-cousins. In the son's generation son and daughter are terms used for own children as also for brother's children (man speaking) and sister's children (woman speaking), while terms nephew (Aliya) and niece (Sose) are used for cross nephews and cross nieces. Beyond these, all children are grandsons and grand-daughters. The brothers and sisters of grand-parents are also called grand-parents. There are no grand-uncles and grand-aunts. In the same way nephew's (cross nephews as also parallel nephews) and niece's children are called grand children. This usage is quite common in the Maratha country,

and it is necessary to bear it in mind when we discuss the marriage practices prevalent in Karnatak.

Some of the peculiarities of these kinship terms can be better understood by a study of the marriage-systems prevalent in this region.

A man may marry a girl who does not belong to the same paternal clan as his and who belongs to the same little sub-caste group as his. This rule is the same as in the Maratha country. Among the Brahmins the clan organisation rests on the Gotra-system. Among the non-Brahmins each clan has a Bedagu (Devak in Maratha country) which is either some tree or animal or even an inanimate object. Families having the same Bedagu do not marry.

Within this circle of allowed mating there are three types of marriages which are preferred to all others. The most preferred type of marriage is that of a man with his elder sister's daughter (Akkan magalu), the second in preference is of a man with his father's sister's daughter (Atteya magalu), and the third is that of a man with his mother's brother's daughter (Mavan magalu). The last two types tend to merge into one in the case where the father's sister has married the mother's brother.

The first type of marriage is found among people of three linguistic regions, i.e., those who speak Tamil, those who speak Telugu and those who speak Kannaḍa. It is also occasionally practised in south Maharashtra and is an obvious cultural borrowing from Karnatak. It is significant that it is the Marathi Deshastha Ṛgvedi Brahmins of the southern Maratha country who practise this type of marriage and not the Maratha agriculturists. Throughout Karnatak among all non-Brahmins including all agricultural sub-castes and untouchables the rule is that a man marries his *elder* sister's (Akka's) daughter and never his younger sister's (Tangi's) daughter. Very minute and exhaustive enquiries did not reveal a single exception to this rule. Among Brahmins, however, this rule is not strictly adhered to. I found a very respectable Brahmin in Bijapur, a retired revenue officer, who had married daughters of both his elder and younger sisters. He stoutly denied the existence of any taboo against marriage with a younger sister's daughters. Other Brahmins rationalised about the custom and said that the elder sister's daughter was the natural choice because there would not be too great a disparity in the ages of husband and wife, but of course if the elder sister had no daughter or if one had no elder sister and one was still unmarried or had lost one's wife one could marry the younger sister's daughter also. One lady in Sholapur gave information about a very interesting custom which showed that even the Brahmin community was aware of the taboo but has recently disregarded it. According to this custom if a man were to marry his younger sister's daughter she must be given in adoption to the elder

sister or an elder female cousin (classificatory sister). After adoption the girl becomes the daughter of the Akka and then a man can marry her.

In the Maratha country cross-cousin marriage is practised by some communities and tabooed by others who are mostly Brahmins or recent settlers from the north. Among the latter owing to cultural pressure cross-cousion marriage does take place as a rarity and then a similar dodge is practised. The maternal uncle's daughter is given in adoption into a family which is not a blood-relation of the groom and then the marriage takes place. The author knows of one such marriage from the Chitpavan Brahmin community in Poona.

The attitude of the Brahmin community to the prevalent type of marriage makes one feel that they have adopted these customs in a process of acculturation by an immigrant minority community. In so doing they have disregarded many of the original taboos on these customs. They are not aware of them or try to circumvent them. In the case of the Chitpavans they have circumvented the taboo against marriage of near kins imposed by sanskritic law-givers and followed by all northern communities, by the myth of adoption. The attitude of Karnatak Brahmins to uncle-niece marriage illustrates the same principle. They have taken up a custom new to them and have disregarded the taboo originally attached to it. We shall see that as regards cross-cousin marriage the Karnatak Brahmins distinguish themselves from the rest of Karnatak castes in some very significant details.

Among most of the Karnatak castes the preferred type of cross-cousin marriage is that of a man with his paternal aunt's daughter. Enquiry among Brahmins showed that they preferred a man's marriage with the maternal uncle's daughter. Among some Brahmin sub-castes like Havigs, etc. marriage with the father's sister's (Atte) daughter was definitely tabooed. Among others it was practised occasionally but more out of necessity than through choice if the maternal uncle's daughter was not available.

In this respect the Karnatak Brahmins follow the marriage practices of the Maratha country. Among Marathas only one type of cross-cousin marriage is allowed and the practice is justified by a folk saying "The creeper must not return" (Parat wel yeta naye). The creeper is the girl given in marriage. Her daughter must not be brought back as a bride into the house as it would be returning of the creeper back to the place from where it started, which would stop the growth of the family and bring it disaster. The same proverb is found in Kannaḍa, "Balli Tirugu baradu", and the same explanation is given as regards its meaning by people who taboo marriage with paternal aunt's daughter.

There is thus a deep-seated feeling behind the two types of cross-cousin marriages. The Karnatak peasantry who practise maternal uncle

and niece marriage, and the marriage of a man with his paternal aunt's daughter do so because they apparently think that the creeper must return, whereas some Brahmin sects in Karnatak and the whole of the Maratha region view such a return with extreme disfavour.

The reason for this difference in attitudes lies in the cultural history of the two regions. Marriage like many important social relationships must have been a system of mutual obligations and returns. If A took a girl from B's family he had to compensate B's family in some way. The best compensation always is doing to the others what they have done to you, in this case by exchange of girls, or through a process of delayed payment giving to B's family their daughter's daughter in marriage. When a daughter's daughter returns to the family as bride the original obligation is cancelled. On this principle a man marrying his father's sister's daughter fulfills the obligation in the second generation. The same principle is at work when a man marries his elder sister's daughter. When the eldest daughter gets married, she secures a bride for the younger brother. In a society based on mutuality of social relationships this marriage procedure appears to be the most natural. Wherever there is an exchange of daughters, naturally the father's sister's daughter is identical with the mother's brother's daughter, but the stress is on the first relationship and not on the second.

When however peoples of different cultures meet and the one conquers the other, a different type of social relationship is established. Since times immemorial the conquering males had a right to the women of the conquered. The conquered stratum of society would be held as inferior to the ruling class. It would be the privilege of the ruling class to choose a bride from the conquered class, but the rulers would never deign to give their daughters in marriage to the ruled. This is the principle of hypergamy.

In a society which is divided into an ascending class or caste-order males of a higher caste or class may marry women of a lower caste. No mutual exchange of daughters can take place in such a society. "Givers shall give and receivers shall receive" is the law. The creeper cannot return in such a society. A man's mother may belong to an inferior family, he can choose a bride from her family and by preference the choice falls upon the mother's brother's daughter. His father's sister on the other hand must have married into a family of equal status or preferably into a family of higher status; she can therefore not give her daughter back into a brother's family.

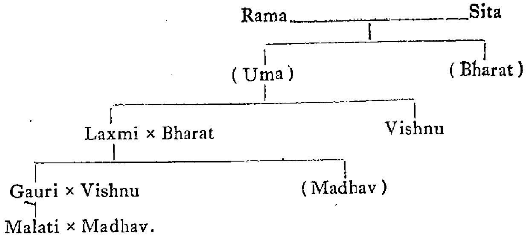
The preference for one type of cross-cousin marriage has its roots in a feeling of social superiority arising out of cultural contact and dominance of one class over another. Both the Rajput and the Maratha

societies are based on clans placed in a hierarchical social order and hypergamy is practised. The general principle which rationalises this procedure, i.e. of a creeper not coming back only gives voice to a deep-seated prejudice. That this type of cross-cousin marriage is practised in the Maratha country which lies between Dravidian and Sanskritic cultural areas in India is also significant. Equally significant is the fact that the Kannaḍa speaking Havig Brahmins living in a Konkani (a sanskritic language) speaking tract and to a lesser extent the other Karnatak Brahmins also show preference to marriage which in their own cultural region is not considered as desirable. The Brahmins are either imitating the taboos of their northern neighbours or are immigrants from the north, who have kept some memories of their ancient customs.

The custom of a man marrying his elder sister's daughter also explains the sharp distinction found in Dravidian terminology as regards *Elder brother* (Anna), younger brother (Tamma), elder sister (Akka) and younger sister (Tangi)—only a Tamma can marry his Akka's daughter. Anna and Tangi each marry their cross-cousins. The terms Jeth (husband's elder brother) and Devar (husband's younger brother) found in all northern languages is a case parallel to the one under consideration. Just as Dravidian languages have no common terms for brother or sister, the northern languages have no term meaning "husband's brother". One must every time specify and qualify by saying husband's elder brother "Jeth", and husband's younger brother "Devar". A widow can marry her husband's *younger* brother but never the elder brother. A woman can joke with the husband's younger brother, but must not show her face to the elder brother. The distinction between the elder and the younger, the existence of distinct terms for each and the lack of a general term are justified by the social practice. Where that function has vanished as in the Maratha country the word "Dir" stands for "husband's brother" without distinction of age. In the same way in Dravidian India (except Malabar) the elder brother and the younger brother, the elder sister and the younger sister have different functions to perform and hence the distinction in terms.

This relationship also explains another Kinship term reported to me by a few women. When asked what they called their husband's sister, they said "Chikkavva". 'Chikka' means small and 'avva' means mother. The word chikkavva is used for the younger sister of the mother. If a woman marries the younger brother of her mother then naturally the husband's sister will always be her younger maternal aunt.

This same type of marriage carried out for three generations leads to a very peculiar relationship as will be seen from the geneological table given below :



Uma is the great grand-mother of Malati.

Bharat who is the brother of Uma is Malati's great grand-father (classificatory).

Bharat's son is Madhav; Madhav is therefore Malati's grand-father. So the marriage of Malati and Madhav is that between a grand-daughter and grand-father.

There are no terms like grand-uncle; beyond the father's generation all male collaterals of the grand-father and grand-mother are grand-fathers, all female collaterals are grand-mothers. A great-grand-father's child would be either grand-mother or grand-father. In this classificatory sense the marriage of Malati and Madhav is a marriage of grand-daughter and grand-father. Their relationship as reckoned from the mother's side is that of an uncle and niece; as reckoned from the father's side however it is that of a grand-daughter and grand-father.

If we view the relationship in this fashion this peculiar type of marriage, so much discussed in anthropological literature as being found occasionally among Australians and Gonds, is a matter of common practice in the whole of Karnatak, Andhra and Tamilnad.

This analysis of the Kinship system and Kinship terms of Karnatak opens a very interesting field for further research. The Kinship terms suggest a family based on cross-cousin marriage. Only one term Chikavva, sister-in-law, and the pairs Anna, Tamma, Akka, Tangi give a glimpse of a custom of uncle-niece marriage. It is necessary to make an analysis of the meaning of words Aliya, Sose, Maru magan, Machchinan, Machchini in Kannada, Telugu and Tamil. In Kannaḍa the word Aliya (nephew or son-in-law) appears to be non-Sanskrit; but the word 'Sose' used for nieces seems to be derived from Sanskrit. Snusa. The word Maru maga (nephew) is used in Malayalam but not known in Kannaḍa. Can Maru maga which means nephew in Malayalam, also have the meaning 'grandson' ? The meanings of these terms must be fixed by referring to folk usages as reflected in proverbs and folk-songs. The

words in Gondi and Kolami must also be compared and then perhaps one may be able to find out whether the uncle-niece marriage was always practised side by side with cross-cousin or not. Cross-cousin marriage of one type is practised in the Maratha country. Cross-cousin marriage of both types, but preferably of a man marrying his paternal aunt's daughter is practised in all Dravidian speaking regions. Maternal uncle and niece marriage is practised in Telugu, Tamil and Kannaḍa speaking country. In Kerala, the Malayalám speaking region, such a marriage is unknown and is also impossible owing to the matrilocal and matriarchal custom where men share the house with their sisters and sister's children. The Maratha preference for one type of cross-cousin marriage has been explained as due to culture contact. Can we explain the existence of uncle-niece marriage side by side with cross-cousin marriage as also due to an ancient culture contact? Is it possible that the custom of uncle-niece marriage was borrowed from a predravidian people of an Austric origin? An answer to this question can be given only by a thorough study of ancient literature and examination of ancient geneologies and folk-tales. A philological study of kinship terms may also help. It is necessary to find out among what castes of all Dravidian area this custom is prevalent and then one may be able to interpret this custom properly.

THE THEORY OF THE ALPHA-PHONOID *

(A Study of Speech Structure)

By

C. R. SANKARAN

[*Abstract:* Professor A. GEMELLI's latest experimental findings regarding the structure of speech elements are given. The 'higher generalization' due to the Alpha-phoneme theory which leads to the conception of further refinement or rather extension known as the 'Alpha-Phonoid' theory is discussed in the light of some Topological concepts. The continuum of the CV configuration which the 'Alpha-Phonoid' theory involves is a many dimensional continuum, and is a 'topological structure of manifoldness'. The epistemological implication of the conception is touched upon.]

Prof. A. GEMELLI[1] gives a summary picture of his latest experimental findings regarding the structure of speech-elements. Some vowels last, according to him,[2] 40 periods, that is to say, even a quarter of a second; other vowels there are in speech which last only two to three periods and they are, therefore, of a very short duration.

Likewise consonants also present themselves variously. Some voiced as well voiceless ones last only for a short time, say about 0.2 second. Still others are very short and they last no longer than an instant, a few thousandths of a second.

There are intervals between sounds and sounds at times which can last for a long time, say something like 0.2 of a second. This recording of the intervals is closely connected with the position of the phonotorious tube. In some other cases, on the other hand, the current of sounds continues with no interruption, for instance, vowels plus voiced consonants, and here the modifications of the phonotorious tube are short. Prof. A. GEMELLI proceeds next on the time-honoured assumption of the influence of vowels on consonants, and vice versa[3]. It is, therefore, very interesting to find GEMELLI observing also that there are consonants which have no influence upon vowels. He

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* Submitted for reading at the Physiology section of the Indian Science Congress at Allahabad, January 1949.

1. In a private communication to me dated 4th May 1948. Universita Cattolica Del Sacro cuore Milano (3-20)—Piazzo S. Ambrogio 9 II. Rettore.

2. A. GEMELLI, Nuovo Contributo alla Conoscenza della Struttura delle Vocali, *Commentationes*, Vol. I, No. 1, pp. 1-43, (1937).

3. The entire approach is vitiated by this assumption, shrouding otherwise much that is valuable. Compare also in this connection the important paper of J. W. BLACK, The effect of the consonant on the vowel. J.A.S.A. 10. pp. 203-5 (1939).

Cf. C. R. SANKARAN, BDCRI 6, 79, foot-note 1, 1946.

proceeds further to observe that there are consonants (the phraseology is his!) which merge into vowels. He records that there are cases in which a vowel stops several times to originate various phases of a consonant. Prof. A. GEMELLI, therefore, comes to the conclusion that there can be no single law to comprehend all of these physical facts. In other words, broadly interpreted, GEMELLI's summing up the present situation in what might be called physical phonetics amounts to saying that the situation here is parallel to microscopic physics, the province of quantum theory, which in 1923 was a little more than a collection of empirical rules and which led to no coherent outlook until the beginning of the 'New Quantum Theory' with the researches of HEISENBERG in 1925 and others that followed him.[4]

It is precisely here that the theory of the Alpha-Phonoid comes into the picture. It is a common knowledge to mathematicians that any two integers first define an integral number, and that any two integral numbers define a rational number, and the convergent sequence of rational numbers $\{a_i\}$ define the symbol $[a_i]$, which is a *real number*. If a, is any rational number, the sequence $a, a, a, \ldots$, or $\{a\}$, is convergent and defines the real number $[a]$[5]. The definition of the Alpha-phoneme follows this procedure. First, the *necessary* and the *sufficient* conditions of the occurrence of the preceding vowel and the following consonant respectively were taken to define the non-linear (?) *Āytam* (which, in the strict sense of the term, can *not* be described as a speech-sound at all!) in old Tamil, by the application of the DEDEKIND 'cut' axiom from the known experimental findings in the field of Physical Phonetics. Next, the generalization was further extended to define the Alpha-phoneme in *any* consonant-vowel configuration, where the articulatory interval *between*[6] the consonant and the vowel was assumed to be zero (cf. my paper, the Problem of the Structure of the Vowels and the Consonants in Human Speech, BDCRI, 9, p. 186, (1948). Now the precise conditions which go to define the *Āytam* phenomenon form the

4. Sir ARTHUR EDDINGTON, *Relativity Theory of Protons and Electrons.* Page 1, Cambridge University Press, 1936.

5. GILBERT DE B. ROBINSON, *The Foundations of Geometry.* Mathematical Exposition No. 1. The University of Toronto Press, Toronto, Canada, 1940, pp. 77–80.

Cf. William Curtis SWABEY, Cassirer and Metaphysics, *The Philosophy of Ernst Cassirer*, The Library of Living Philosophers, Vol. VI, Cambridge University Press, London, 1949, p. 134.

6. Really speaking there is a three point relation of "order" in the strictly mathematical sense. Compare in this connection, the replacement by VEBLEN of the notion of "betweenness" in PEANO's system by a three point relation of "order". (GILBERT DE B. ROBINSON, *op., cit.*, page 51). Since the *whole* CV configuration under question is *conceived* to be *partitioned* into consonantal sound profiles, non-consonantal sound profiles, non-vowel sound profiles and vowel sound profiles, it would be more precise to say that we are concerned here with a "four point" relation of *order* (GILBERT DE B. ROBINSON, *The Foundations of Geometry*, p. 52).

'environment' designated as the Alpha-phonoid,[7] in terms of which *any* "environ" in human speech (and music too)[8] could be compared.

7. It must be borne in mind that more precisely the relation between the *Āytam* concept (due to Tolkāppiyar) and the alpha-phonoid concept is not one of identity or of reversibility but a one-way or irreversible system like the law of Entropy, i.e., the loss of organisation (Cf. E. T. WHITTAKER'S review of Hermann WEYL'S *Philosophy of Mathematics and Natural Science, Nature*, Vol. 165, p. 566). In other words the relation between the *Āytam* concept and the alpha-phonoid concept is one of asymmetry like those questions of probability (Cf. Norbert WIENER'S *Cybernetics*, pp. 43-44, John Wiley and Sons, 1948), which are conditioned by asymmetry in contrast to the Newtonian system where time is perfectly reversible.

The alpha-phonoid is only an *a priori* convention. (Cf. foot-note 3 of my forthcoming Monograph on the *Phonemics of Old Tamil*).

Again it is also clear that the Alpha-phonoid is a symbol concept being a "sensuous" representation of the "non-sensuous". Cf. *Philosophy of Ernst Cassirer*, p. 106 (see foot-note 3 of my Monograph).

8. In all the physical studies of music, the problem of the 'vibrato' is most important. "Good voice-quality is inseparably connected with a smooth and fairly even variation occurring around a central mean about 6 or 7 times a second in usually all three of the variables : pitch, intensity and timbre". (W. T. BARTHOLOMEW, A Physical definition of Good voice-quality in the male voice, JASA 6. p. 26). Again, "It is a well-known fact that many singers do not attempt to hold a sustained note at constant pitch, but produce a periodic variation of the pitch known as 'vibrato'." ALEXANDER WOOD, *The Physics of Music*, (1944), p. 56. See also pp. 107 and 133. Cf. too W. T. BARTHOLOMEW, *Acoustics of Music*, (1946), pp. 21-6. The problem of the 'vibrato' as related to the melodic structure of Indian music has so far not been studied at all. As a special case of the 'vibrato' problem applied to Indian music, the frequency range (as determinable by the rigorous statistical analyses of an extensive data) for instance, within which the same note varies in two different melodies (Rāgas) [even for the same singer], depends on the 'context of the situation', i.e., the 'environment' which itself is *determined* by other notes in each Rāga. The definition of the standard or unit 'environment' (the Alpha-phonoid) in human speech as envisaged here would serve to measure naturally such an 'environment' in music also.

L. KAISER (Biological and Statistical Research concerning the speech of 216 Dutch students ANPE 17, 163, 1941) observes that there exists a high degree of regularity in the pitch of the low resonatory tones, low formants, in the system of the Dutch vowels and consonants. She poses the problem whether within the territory of 800 or 1000 to 7000 for the articulatory sounds, resonatory tones are really absent having already found a zone of resonatory tones lying between 250 and 640 or perhaps 800 or even 1000. Her answer to this question is that this is not probably the case, a region from 2500 or 3200 or 4000 presenting itself in vowels as corresponding to resonatory tones. "Various investigators—HERMAN, PAGET, FLETCHER, CRANDALL, STUMPF, BARCZINSKI and THIENBAUS, F. TRENDELENBERG, GEMELLI, BLACK, LASSE, BARTHOLOMEW, PELSKY mention high formant in various vowels (TENDELENBERG e.g. especially in the vowel 0). GEMELLI maintained that on this element partly depends the individual character of speech sounds. BARTHOLOMEW was the first to describe this as an automatic phenomenon, being especially important in singing and being probably due to the resonance of the larynx itself. PELSKY, in several Dutch singers, could affirm the results of BARTHOLOMEW, these tones in most singers getting relatively very strong with increased intensity of sound". Again, L. KAISER raises the most interesting question whether consonants also show high resonatory tones. "The fact that the presence of the high resonatory tones seems to a high degree dependent on the intensity of sound reduces the value which these tones as an individual characteristic might have". Problems of this type have to be studied in the wider perspective provided by the Alpha-phonoid theory.

It should be possible to define this standard (or, perhaps even a Unit environment) as a characteristic value differential equation. It is a uniform probability distribution of event-particles forming a hyper-spherical space (cf. EDDINGTON, '*Fundamental Theory*, Cambridge University Press, 1946, p. 13). Such a definition would be an *implicit definition*, being generating and creative even as the definition of the Alpha-phoneme (for an *implicit definition* see GILBERT DE B. ROBINSON, *op., cit.*, p. 8),[9] and will lead to a chain of new developments which have no counterpart at present in what is ordinarily known as the physical phonetics, even as the *wave-tensor calculus* led to bridge the earlier Relativistic conceptions with quantum theory.[10] The Alpha-phoneme theory and its successor the Alpha-phonoid theory attempt to raise physical phonetics from the rock bottom of empiricism to a purer mathematical thought emphasising that all physical knowledge of speech structure is relative to consonant and vowel partitions, even as all physical knowledge is relative to space and time partitions.[11] The (Alpha-) phonoid conception is based on the principle that 'in finding a general condition, it may be of a great help to know a special case'.[12]

The main aim of the present paper is to state clearly some topological ideas which arise on the basis of the Alpha-phonoid conception. First, starting with the Alpha-phoneme theory, the problems of the continuous spectrum of a CV configuration with the Weierstrass limit *between* confronts us. This problem has to be tackled from psycho-physical research of a mathematical sort on the following lines. Each 'profile' in an infinitesimal region should be viewed as a space construct —a *continuous manifold* in which 'positional relationships' have to be expressed. Rather than defining *position* in terms of *distance* and *direction* as in Euclidian space,[13] I now suggest that we have to define position in terms of *relation* as in *topological* space. "Geometry is concerned with all possible logical constructs about space. Since RIEMANN's great paper (B. Riemann, *Über die Hypothesen welche der Geometrie zu Grundeliegen*, edited by H. WEYL, Berlin, Julius Springer, 1923) spaces

9. Carl H. HAMBURG, Cassirer's conception of Philosophy, *The Philosophy of Ernst Cassirer*, The Library of Living Philosophers, Vol. VI, pp. 104–105.

Also E. CASSIRER, *The Problem of Knowledge*, 1950, p. 26 (Oxford University Press, London).

10. EDDINGTON, *loc., cit.*, pp. 1–2.

11. See EDDINGTON, *Space, Time and Gravitation*, Cambridge University Press, 1931, p. 82.

12. EDDINGTON, *ibid*, p. 89.

13. Cf. "From its origin in the study of axiomatics, non-Euclidean geometry has developed into an exceedingly useful instrument for application to the physical world. In the theory of Relativity, in optics, and in the general theory of wave propagation, a non-Euclidean description of phenomena is sometimes far more adequate than a Euclidean one". R. COURANT and H. ROBBINS, *What is Mathematics?* Oxford University Press, (1946), p. 227.

may be constructed of any dimensions and properties, provided these are logically consistent, and also the properties of a space may be dependent on the dynamics of processes within that space." In the new definition of each 'sound-profile' in the CV configuration involved by the Alpha-phoneme theory as a space construct, space has to be understood in its post-Riemannian sense. In terms of relationships, a finer understanding of speech-structure should be possible through the further development and refinement or rather extension of the Alpha-phoneme theory, topology giving us the mathematics necessary to set up theories about the *continuous spectrum*, in the CV configuration here, where *fundamental measurement* seems to be *not* possible at the present time.[14]

The continuum of the sound-profiles in the CV configuration as Riemann would have it "has its own arithmetical scheme which is fixed by the combinatorial description of the manner in which the particular elementary pieces border each other at the time of their partition, i.e., through the 'topological structure of manifoldness' ".[15]

In the time continuum under question, since we can distinguish theoretically infinitely small regions within the *entire continuum*, it is infinitely structured. Again, the 'Alpha-phoneme' is a *cut*[16] constructed through the whole region of the continuum which is, therefore, a simply or one-fold connected region. The *cut* (Alpha-phoneme) divides the *continuum* (the totality of the CV configuration) into two simply connected regions, viz., the consonant and the vowel.[17] The

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14. Cf. J. Brown, On the use of mathematics in psychological theory *Psychometrika*, Vol. I, No. 1, (March 1936), pp. 80-84.

15. Herm. Weyl, *Philosophie der Mathematik und Naturwissenschaft*, (Handbuch der Philosophie), München und Berlin, R. Oldenbourg, 1927, p. 63. K. H. Niebyl, Modern Mathematics and some Problems of Quantity, Quality, and Motion in Economic Analysis, *Philosophy of Science*, 7, (1940), p. 105.

16. Cf. "When a moment intersects an event, it also intersects the boundary of that event. This locus, which is the portion of the boundary contained in the moment, is the bounding surface of the corresponding volume of that event contained in the moment. It is a two dimensional locus.

"The fact that every volume has a bounding surface is the origin of the Dedekindian continuity of space".

A. N. Whitehead, *The Concept of Nature*, Cambridge, at the University Press, 1926, p. 102.

17. For topological concepts here referred to, see R. Vaidyanathaswamy, *Treatise on Set Topology*, Part I. (1947), pp. 37 and 53. Cf., also Brown, on the use of Mathematics in Psychological theory. *Psychometrika*, Vol. I, No. 1, (March 1936), pp. 85-86. Also see Kurt Lewin, *Principles of Topological Psychology*, (English Translation by Fritz Heider and Grace M. Heider), 1936, p. 89, (New York and London).

See also R. Vaidyanathaswamy's Presidential address: "The New Mathematics" to the Section of Mathematics, proceedings of the 35th Indian Science Congress, Patna, 1948, p. 218.

continuum in question is bounded, and lies (and, therefore, may be said to be constructed) in the unbounded, unlimited region of *time*.

The full implication of the theory of the Alpha-phonoid is a multi-dimensional continuum of speech treated as non-Euclidean space structures. For, though to start with, the CV configuration of the Alpha-phoneme theory may be treated as *unidimensional* sequence of an infinite series of sound profiles purely for the sake of convenience, it should not be lost sight of that it is mathematically possible to create as many additional dimensions to this continuum as are necessary to enable us to treat adequately the problem.[18] As L. KAISER [19] points out, "it is very instructive to recognize the various sound qualities in an exact sound curve, i.e., a cathode-ray-oscillogram. In the curve we discern two dimensions, a time dimension, the film having moved with a certain rapidity along the objective of the camera, and a dimension perpendicular to the first, indicating the amplitude and the phase of the vibration".[20]

With regard to both the theories of the Alpha-phoneme and the Alpha-phonoid (it is too obvious to point out at this stage that the latter is only a further refinement or rather extension for the purpose of 'communication'[21] of the much earlier conception of the Alpha-

18. Our continuum here is treated as a four-dimensional one of 'point events' or 'point-singularities' implying that the alpha-phoneme construct is an 'inner transcendental experience' (vide my Monograph on *Old Tamil Phonemics*, foot-notes 13a, 80 and 102(a)).

In this continuum is involved the conception of the *translation of time into space*; the conception of 'point-singularity' implies the "entrance of the fourth dimension into three dimensional space". (Cf. P. D. OUSPENSKY, *Tertium Organum*, London, Routledge and Kegan Paul Ltd., 1949, 3rd ed., pp. 42 and 43 and also p. 49).

19. L. KAISER, Biological and Statistical research concerning the speech of 216 Dutch students, A.N.P.E. 15, 1939, p. 3.

20. Cf. again, "Patterns included in this text are, except where otherwise indicated, examples of a linear display. Such patterns may be varied in form by modifying the portrayal of any or all of the three basic dimensions, frequency, time and amplitude" (R. K. POTTER, G. A. KOPP and H. C. GREEN, *Visible Speech*, New York, 1947, p. 305).

Referring to one of the results of this work, viz., the development of a sound spectrograph for the study of the composition of speech-sounds and complex wave-forms, I quote the following relevant passage of a letter to me from the Kay Electric Company, U.S.A., dated Dec. 6, 1948.

"This equipment records on a magnetic drum voice sounds of 2.4 seconds duration. This sample is then recorded on a strip of teledeltos current sensitive paper. The resulting record is a three dimensional display which indicates frequency and energy distribution vs. time. In addition to this type of display, a second display may be recorded at any selected time in the speech sample which is a two dimensional record of energy vs. frequency. The frequency response of the instrument is 85 to 8000 cps".

21. Cf. My Monograph on *Old Tamil Phonemics*, foot-note 3.

phoneme !), I wish to make a final observation here of epistemological nature in the words of ALBERT EINSTEIN :—

"A geometrical physical theory as such is incapable of being directly pictured, being merely a system of concepts. But these concepts serve the purpose of bringing a multiplicity of real or imaginary sensory experiences into connection in the mind. To 'visualise' a theory, or bring it home to one's mind, therefore means to give a representation to that abundance of experiences for which the theory supplies the schematic arrangement".[22]

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22. ALBERT EINSTEIN, *Sidelights on Relativity*, II, Geometry and Experience. Translated by G. B. JEFFERY and W. PERRETT, London, 1932, pp. 45–46.

Cf. also : "Any serious consideration of a physical theory must take into account the distinction between the objective reality, which is independent of any theory, and the physical concepts with which the theory operates. The concepts are intended to correspond with the physical reality, and by means of these concepts we picture this reality to ourselves......the correctness of the theory is judged by the degree of agreement between the conclusions of the theory and human experience. This experience in physics takes the form of experiment and measurement".

A. EINSTEIN, B. PODOLSKY AND N. ROSEN, *Physical Review*, 1935, Vol. 47, p. 777, as quoted by R. L. WORRALL, *Energy and Matter*, Staples Publication, London, 1948, p. 11.

MIDDLE DEMONSTRATIVE *u* IN OLD KANNAḌA

By

G. S. GAI

In a paper dealing with this problem[1] it has been shown that like Tamil, Kannaḍa too possessed the middle demonstrative element *u*. In supporting this theory, the examples quoted such as *uvam*, *uvaḷ*, *udu*, *undu*, *untu*, as opposed to *avam*, *avaḷ*, *adu*, *andu* and *antu* respectively are all taken from the *vṛtti* or *prayōga* given in the traditional grammars of the Kannaḍa language.[2] Dr. A. N. NARSIMHIA, who has studied the Kannaḍa inscriptions of the 6th and 7th centuries A.D. from the linguistic point of view, has not noticed any instances such as *undu*, *untu* referred to above.[3] Nor have I come across these examples in my study of the language of the Kannaḍa inscriptions of the 8th to 10th centuries A.D.[4] It is, therefore, interesting to find examples of such type in early inscriptional literature.

An inscription from Hoṭṭur in the Shiggaon taluk of the Dharwar district and belonging to the time of the Western Chāḷukya king Sōmēśvara I, dated in Śaka 988 (A.D. 1067), describes the king's subordinate one Māra-Gāvuṇḍa in the following words :—[5]

kuḍuvar = vvēḍidoḍ = artthig = artthi-(rttha)-chayamaṁ śrīmaṁtar = uṁt = ēnumaṁ kuḍar = ī lōkadoḷ = ond = apūrvvav = enisal = kāl = illadar = vvēḍi bandaḍe kālaṁ nija-śaktiyiṁ palargge(rge) goṭṭaṁ Māra-Gāvuṇḍan = endaḍe tat-sat [t] vada tat [t*] vad = uṁnatiyan = aṁt = iṁt = uṁt = [e*] nal = bērkuvē ||*[6]

In this verse the morpheme *uṁtu* occurs twice and in one case along with *aṁtu* and *iṁtu* which are adverbs of manner meaning 'in *that* manner' and 'in *this* manner' respectively. The *u* in *uṁtu* is clearly an intermediate demonstrative element and serves a separate purpose from *aṁtu* and *iṁtu* wherein $^+a^+$ and *i* are remote and proximate demonstrative elements respectively. Dr. L. D. BARNETT, who has edited this inscription, does not offer any remarks about *uṁtu*. He, however, translates it as 'this wise' when it occurs first and omits its translation when it occurs for the second time along with *aṁtu* and *iṁtu*. Therefore, his translation has to be modified as something like 'this–(i.e. intermediate–) wise' and 'that–, this–, and intermediate– wise' in the proper place, thus giving the literal meaning of the morpheme *uṁtu*.

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1. C. R. SANKARAN and G. S. GAI, The Demonstrative Element *u* in Dravidian, *Indian Linguistics*, Vol. II, pp. 242–50.
2. *Ibid*, pp. 24 –48.
3. See the Index in his work *A Grammar of the Oldest Kanarese Inscriptions*.
4. See the Index-Verborum in my book *Historical Grammar of Old Kannaḍa*.
5. *Epigraphia Indica*, Vol. XVI, p. 84 text ll. 15–7. It is a verse in the *Mattēbhavikrīḍita metre*.
6. A translation of this verse is given in *ibid*, p. 87.

THE PSYCHOLOGY OF THE DRONE IN MELODIC MUSIC*

By

B. CHAITANYA DEVA

(Phonetics Laboratory, DCRI)

[*Abstract:* One of the basic principles of artistic technique in music is the resolution of excitation into repose. In melodic music this is achieved by the resolution of dissonance into consonance and the movement of the melody away from the base of rest into a movement towards the base. The function of the drone (as supplied by the *tambūra*) is discussed from such a point of view. (1) The *tambūra* supplies the tonal background necessary for the proper perception of the consonance and dissonance of the various tones in a melody. Such a background is seen to consist of (a) the objective overtones generated by the strings of the *tambūra* and (b) the subjective tones—aural harmonics and combination tones—produced within the ear. The factors considered in this context are: the probable number and intensity of these tones, the effect of phase differences among them, and their mutual masking. The more prominent combination tones from the G and F types of drones are given. (2) The position and significance of the drone in a melodic movement are discussed under two heads: (a) as an integrator, when the drone functions as an auxilliary to a psychological base in relation to which all the notes in the melody are perceived. This psychological base, with the external drone as a help, integrates the melody into a whole. A probable auditory and psychological mechanism for this process is suggested; (b) as a rest note on to which the whole melody finally comes to rest. Any movement away from this creates excitation which is eventually resolved by coming to rest on this note. The nature of subsidiary tonics and leading notes are discussed. In this case also, the phenomenon is primarily psychological and the drone is a subsidiary.]

Elsewhere[1] it was suggested that the emotional content of a tone or a musical phrase is perceived against two backgrounds—the 'remote' and the 'immediate'. The 'remote' background is the standard scale (I avoid the word *śuddha*[2])—*Bilāval* in the Hindustani system and *Māyamāḷavagauḷa* in the Carnatic system. It is in terms of this standard scale that a musician evaluates in part the flatness or sharpness of any particular note he uses. The 'immediate' background is the drone[3] (as supplied by the *tambūra*) and the musical 'environment'.[4] Each tone

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in a musical situation is referred to this background and it is against this that its tonality is perceived.

The emotional value of a tone in melodic music is perceived 'immediately' in terms of (I) its consonance-dissonance relationship to the accompanying drone, and (II) its position in the melodic scheme, wherein the drone functions as the key-note. Thus the function of the drone may be considered under two main heads (1) tonal background and (2) key-note, which again is of two functional categories (a) integrator and (b) rest-note.

Consonance-Dissonance Relationship: This relationship is, in a way, different in Indian music from what it is in Western music. In Western music the consonance-dissonance relationship of a tone depends upon its position in a chord (apart from its position in the melodic scheme). Since transposition is a feature of that music, no tone maintains its relationship constant and the emotional value of the tone varies according to the chord-environment. But in melodic music this is not possible, since there is no transposition. Once a key is chosen it has to be maintained throughout the musical piece, and hence a tone (apart from its melodic position) maintains a fairly constant relationship to the external drone. Depending upon this relationship a tone is 'bright' or 'sad'; if it is consonant with the drone it will suggest rest, satisfaction, peace, and happiness (though it is questionable whether any *Rāga*, as pure melody without any conspicuous rhythmic effect, is ever a 'happy' one[5]); and when very dissonant the emotion will be one of pain, unhappiness and desire for rest. Any shade of emotion between these two extremes will be dependent again on the degree of consonance or dissonance of the tones employed. And it is well to emphasise that dissonance has as much (perhaps more) importance in music as consonance, for one of the basic aesthetic principles in music is the resolution of dissonance (excitation) into consonance (repose). The consonance-dissonance series as given by SEASHORE (after Malmberg) is :—[6]

c′ c″; c′ g″; c′ a′; c′ e′; c′ f′; c′ a♭′; c′ e♭′; c′ g♭′; c′ b♭′; c′ d′; c′ b′; c′ d♭′. This series of dichords is based on the consideration of combination of three factors—smoothness, purity, and blending. ORTMANN gives the following distribution of pleasantness-unpleasantness :—[7]

Maj. third; Octave; Min. third; Maj. sixth; Min. sixth; Aug. fourth; Perfect fourth; Perfect fifth; Min. seventh; Maj. second; Maj. seventh; Min. second. (Notice the position of the Perfect Fourth and Fifth).

It is obvious, therefore, that the mood of a melody will largely depend on the nature of the notes employed in it, specially the *vādi* (dominant) and the *samvādi* (subdominant).

The importance of the tonal background, therefore, necessitates a detailed study of the *tambūra*.[8] What follows is nothing more than a discussion of the various factors that go to make up this background;

since no experiment has been conducted on formant of the *tambūra*, any direct reference to it is not possible.

The tonal background may be considered under two categories: (i) objective and (ii) subjective.

(i) The fundamentals and the objective overtones from the strings of the *tambūra* constitute the objective tonal background. According to the notes used in a *Rāga* the *tambūra* is tuned in one of the following ways:

G̣ C C C̣; F̣ C C C̣; Ḅ C C C̣; (The last is not very common).

The last two types of tuning are absent in the Southern system of our music.[9] The audible upper partials of the G and F types of drone are most probably as follows:—[10]

	Fundamental	*Harmonics* 1	2	3	4	5	6	7	8	9
		1	2	3	4	5	6	7	8	9
G type	C	C	c	g	c′	e′	g′	7b♭′	c″	d″
	C̣	C̣	C	G	c	e	g	7b♭	c′	d′
	G̣	G̣	G	d	g	b	d′	7f♭′	g′	a′♯
F type	C and C̣ will be the same as in the above type.									
	F̣	F̣	F	c	f	a	c′	7e♭′	f′	g′

The order of the intensity of the harmonics will have to be experimentally determined.

A fact of great interest in this connection is that the mode of vibration of the *tambūra* strings does not obey the Young-Helmholtz law[11]—i.e, in the case of the strings of the *tambūra*, harmonics having a node at the point of excitation are also generated. C. V. RAMAN has shown this to be due to the grazing contact of the string with the curved surface of the bridge. He further remarks that the *intensity* of the harmonics is independent of the position of the plucked point. How far this is true remains to be tested, for it is a common experience of musicians that the best point to pluck the string is about 2/3 the length of the string from the bridge. Perhaps what RAMAN implies is that the relative intensities of the harmonics (their ratios to one another) are independent of the point of excitation.[12] Further experimentation with regard to this is obviously a necessity.[13]

(ii) *Subjective tones*: Subjective tones are those that are generated within the ear, though they can be shown to be absent in the impressed tone. This phenomenon is due to the non-linearity and asymmetry of the transmission-mechanism of the ear. Above a certain limit of amplitude of the impressed tone of frequency f, the ear records not only this frequency but also generates frequencies 2f, 3f, 4f and so on.[14] These are called the aural harmonics. When two tones impinge on the ear, besides the aural harmonics combination tones of the two tones are also

generated within the ear. Thus subjective tones are of two kinds: aural harmonics and combination tones.

Aural harmonics: As mentioned above, aural harmonics are generated due to the non-linearity and asymmetry of transmission in the auditory mechanism. But, for the aural harmonics to be generated the impressed tone must be above certain limits of sensation level; and these levels vary with the frequency of the impressed tone.[15] From the fundamental tones of the *tambūra* we may expect a long series of aural harmonics; but it is doubtful whether the objective harmonics (especially the higher ones) are intense enough to generate any aural harmonics. Only an experimental evidence can decide this.

The intensity-relationships of the various aural harmonics are shown in Fig. 1. For example, if the intensity-level of the fundamental is 0 bel, the intensity-levels of the successive aural harmonics are −1.4, −2.6, −3.7, −4.8 bels, etc. Also it has been shown that the relative size of harmonics is independent of the frequency.[16]

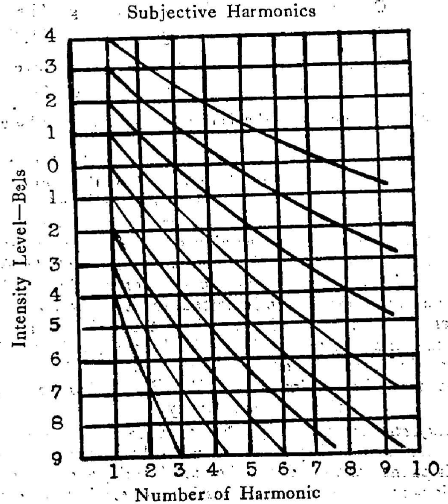

Fig. 1

Showing the intensity-level of various aural harmonics in relation to the fundamental at the intensity indicated. (Courtesy, The Bell Telephone Lab., reproduced from H. Fletcher's, 'A Space-Time Pattern Theory of Hearing', J.A.S.A., Vol. I, p. 314, Fig. 2).

Another factor that may have to be taken into account is the relative stability of the even and odd harmonics. NEWMAN, STEVENS and DAVIS have shown from experiments of the ears of guinea pigs and cats that the curves of aural harmonics for the intensities of auditory stimulus and response follow closely the curve for the primary tone (Fig. 2). The curves for the primary and the odd aural harmonics are linear within certain limits of intensity of stimulus, after which they flatten and reach a maximum; however in the case of the even harmonics they indicate decreasing values for response after the maximum, unlike the odd harmonics which follow the primary more closely. In other words, the odd harmonics are stabler functions of intensity than even harmonics.[17]

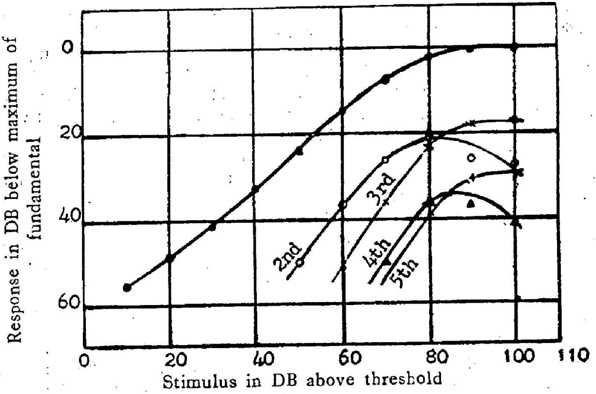

Fig. 2.

"Analysis of the cochlear response of a cat when stimulated with a pure tone of 1000 cycles. Abscissa values represent the intensity of the stimulus in decibels above the human threshold. The ordinate scale is in decibels below the maximum value of the fundamental. The uppermost curve shows the magnitude of the fundamental in the response when the ear is stimulated with sound intensities plotted along the abscissa. The other curves in order show the magnitude of the second, third, fourth and fifth harmonics. Thus the intersections along any vertical line give the relative magnitudes of the first five partials in the response when the ear is stimulated with a given tone". (Reproduced from E. B. Newman, S. S. Stevens and H. Davis, 'Factors in the Product on of Aural Harmonics and Combination Tones', JASA, IX, p. 108, Fig. 2, with kind permission from Prof. E. B. Newman, Psychological Lab., Harvard University).

Combination tones: When two pure tones are made to impinge on the ear, not only their aural harmonics but also their summation and difference tones are generated within the ear. That is, if h and l are

the two primary tones, the summation tones will have the values— $h + l$, $2h + l$, $2l + h$ and so on; the difference tones will be $h - l$, $2h - l$, $2l - h$, etc. In general the combination tones will have the value ($mh \pm nl$) where h and l are the primaries and m and n are integral numbers of any value.

WEGEL and LANE analysed a mixture of combination tones when a primary of 1200∾ at a magnitude of 6×10^4 was present along with a secondary tone of 700∾ at about the same intensity. The frequencies in the mixture were:

f_1 : 1200∾ (primary); f_2 : 700∾ (secondary); $f_1 + f_2$: 1900; $f_1 - f_2$: 500; $2f_1$: 2400; $2f_2$: 1400; $3f_1$: 3600; $3f_2$: 2100; $2f_1 + f_2$: 3100; $2f_1 - f_2$: 1700; $2f_2 + f_1$: 2600; $2f_2 - f_1$: 200 (?); $4f_2$: 2800; $2f_1 + 2f_2$: 3800; $2f_1 - 2f_2$: 1000; $3f_1 + f_2$: 4300; $3f_1 - f_2$: 2900; $3f_2 + f_1$: 3300; $3f_2 - f_1$: 900.[18]

WEVER and his colleagues observed some of the following important characteristics of combination tones: (a) the combination tones increase in prominence as the intensity of stimulus is increased, (b) "the difference and summation tones show closely similar patterns under all conditions" [19] and (c) "*The production of combination tones does not seem to be limited by the frequency of separation of the primaries*".[20] They appear for primaries of closely similar frequencies and for primaries from either end of the tonal scale.

They were able to detect 40 components (without any attempt to exhaust all the possibilities!) upto the 8th order, using 1000∾ and 2800∾, with 1000∾ and 1300∾ upto the 10th and 11th orders, with 100∾ and 10,000∾ upto the 20th order.[21] The more prominent combination tones observed in another experiment, by the measurement of electrical responses of cochlea of guinea-pigs were: [22]

h : 2800; l : 1000; $h - l$: 1800; $h + l$: 3800; $2h - l$: 4600; $2h + l$: 6600; $h - 2l$: 800; $h + 2l$: 4800; $2h - 2l$: 3600; $2h + 2l$: 7600; $3h - l$: 7400; $3h + l$: 9400; $3h - 2l$: 6400; $3h + 2l$: 10400; $3l - h$: 200*; $3l + h$: 5800; $2h - 3l$: 2600; $2h + 3l$: 8600; $3h - 3l$: 5400; $3h + 3l$: 11400.

NEWMAN, STEVENS and DAVIS[23] conducted similar experiments on the ears of guinea-pigs and cats. With two tones, U = 1200∾ and L = 700∾ at 90 db, they found a total of 66 different subjective tones! The most prominent of these were:—$2L - U$: 200; $2U - 3L$: 300; $U - L$: 500; $2U - 2L$: 1000; $2U - L$: 1700; $3U - 2L$: 2200; $U + L$: 1900; $2L + U$: 2600; $2U + L$: 3100; $3L + U$: 3300; $2U + 2L$: 3800. Amongst the 66 tones were 3 tones of the 7th order, 10 tones of the 6th order.

It is very interesting to note that aural harmonics and combination tones within the region of audibility can not be produced by tones which are above this region.[24]

From the above data the following table has been constructed to show the more prominent combination tones obtainable from the G and F types of the *tambūra*:

	G Type		G Type / F Type	F Type	
Combination	h :-Sa : 1 l :-P̣a : 3/4	h :-P̣a : 3/4 l :-Ṣa : 1/2	h :-Sa : 1 l :-Ṣa : 1/2	h :-Sa : 1 l :-Ṃa : 2/3	h :-Ṃa : 2/3 l :-Ṣa : 1/2
h − l	1/4 : S̤a	1/4 : S̤a	1/2 : Ṣa	1/3 : M̤a	1/6 : M⃨a
h + l	7/4 : ni	5/4 : Ga	3/2 : Pa	5/3 : Dha	7/6 : ga
2h − l	5/4 : Ga	1 : Sa	3/2 : Pa	4/3 : Ma	5/6 : Ḍha
2l − h	1/2 : Ṣa	1/4 : S̤a	......	1/3 : M̤a	1/3 : M̤a
2h + l	11/4 : ṁa	2 : Ṡa	5/2 : Ġa	8/3 : Ṁa	11/6 : ni
3h − l	9/4 : Ṙi	7/4 : ni	5/2 : Ġa	7/3 : ġa	3/2 : Pa
3h + l	15/4 : Ṅi	11/4 : ṁa	7/2 : ṅi	11/3 : ṅi	5/2 : Ġa
h − 2l	......	......	......	......	......
h + 2l	5/2 : Ġa	7/4 : ni	2 : Ṡa	7/3 : ġa	5/3 : Dha
2h − 2l	1/2 : Ṣa	1/2 : Ṣa	1 : Sa	2/3 : Ṃa	1/3 : M̤a
2h + 2l	7/2 : ṅi	5/2 : Ġa	3 : Ṗa	10/3 : Ḋha	7/3 : ġa
3h − 2l	3/2 : Pa	5/4 : Ga	2 : Ṡa	5/3 : Dha	1 : Sa
3h + 2l	9/2 : R̈i	13/4 : ḋha*	4 : S̈a	13/3 : r̈i*	3 : Ṗa
3l − h	5/4 : Ga	3/4 : P̣a	1/2 : Ṣa	1 : Sa	5/6 : Ḍha
3l + h	13/4 : ḋha*	9/4 : Ṙi	5/2 : Ġa	3 : Ṗa	13/6 : ṙi*
2h − 3l	......	......	1/2 : Ṣa	......	......
2h + 3l	17/4 : r̈i*	3 : Ṗa	7/2 : ṅi	4 : S̈a	17/6 : ṁa
3h − 3l	3/4 : P̣a	3/4 : P̣a	3/2 : Pa	1 : Sa	1/2 : Ṣa
3h + 3l	21/4 : G̈a*	15/4 : Ṅi	9/2 : R̈i	5 : G̈a	7/2 : ṅi

The order of emphasis of combination tones (numerical order):

G type : Sa, Ga, Pa, ni, Ri, ma dha Ni, ri.
F type : Sa, Ma, Pa, Dha, Ga ni, ga, ri, ma Ri.

In the Svara notation against each interval in the above table the following scheme has been used : for all notes of greater interval than *triśruti* (minor tone) in the case of Ri and Dha (D and A), for notes with higher values than *Antara gāndhāra* and *Kākaḷi niṣāda*, and for *śuddha madhyama* capitals have been given; for all other notes (except, of course ṣadja and pancama) names are without capitals.

Some of the intervals are very interesting and it will be of great significance to know whether they are ever used in our music. These are indicated by an *.

The presence of aural harmonics and combination tones, therefore, modify the perception of tonal quality to a very great extent. The extent and nature of this modification can be gauged by a study of the outer- and inner- ear spectra of the tones concerned. Since no data of this nature are available with regard to the *tambūra* the spectra of an organ are given below (Fig. 3). The top diagram shows the loudness-spectrum of the outer ear and the lower one shows the loudness-spectrum of the inner ear, as calculated on the basis of the non-linear properties of the ear.[25] If even the simple tone of an organ is so complicated, how much more must be that of the *tambūra*, which must have even the outer ear spectrum extremely rich in overtones?

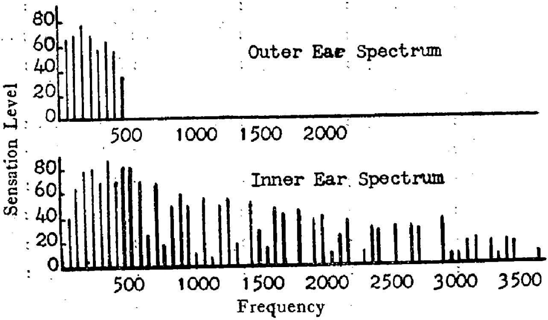

Fig. 3

Loudness Spectrum of an Organ Tone (Reproduced from H. Fletcher, 'Speech and Hearing', Van Nostrand, 1948, p. 179, Fig. 91; courtesy The Bell Telephone Laboratories, Inc., New York).

Another factor in the production of tones in the ear is the phase differences of the tones concerned. A phase difference may introduce its own tonal rhythmic-patterns ('phase beats') which may be perceived as tones by the ear.[26] Moreover, phase relations of the various harmonics alter the loudness, quality and the total experience of the harmonics, when the fundamental is of low frequency[27] (as Ṭ, Ḡ and F̣ are).

Lastly, the role of masking is a very important one. For, whatever may be the subjective tones produced in the ear and whatever be the objective tones from the *tambūra*, many of them may be inaudible due to mutual masking of one another. The degree of masking of the high tones by the low tones is of special importance, for it may be stated as a general rule that 'when the masking tone is loud, it masks tones of higher frequency better than those of lower frequency than itself' and 'the presence also of *subjective overtones* in a loud tone accounts for the

large amount of masking of tones higher than itself by a loud masking tone'.[28]

'The character of the sensation when two tones are acting together on the ear varies considerably with the relative frequency and intensity values'.[29] Fig. 4 indicates some of the implications of this statement. It represents the sensation caused by a tone of 1200 ∾ and magnitude 10^4 in combination with various secondary tones. The continuous line is the masking audiogram for this tone of fixed frequency and the dotted lines indicate the boundaries of auditory regions wherein the types of tones heard are indicated.

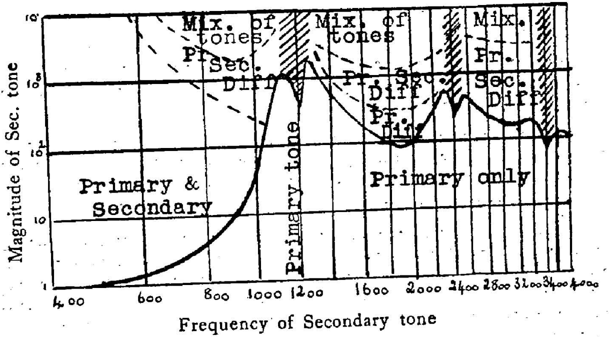

Fig. 4

'Sensation caused by two pure tones'. The continuous line is the masking curve for a primary tone (1200 c.p.s.) by secondary tones of various frequencies and intensities. The dotted lines enclose areas wherein the tones perceived are indicated. The shaded areas denote the region of beats. (Courtesy, the Editor, 'Physical Review', reproduced from R. L. Wegel and C. E. Lane's, "The Auditory Masking of one Pure Tone by another and its probable Relation to the Dynamics of the Inner Ear", Phys. Rev. Vol. XXIII, p. 272, Fig. 5).

For sensation levels below the masking curve, only the primary tone (the masking tone) is heard. Above this, in the region of frequency limits of 1200 ∾ and 2400 ∾, the secondary tone is detected by the presence of primary and difference tones—i.e., the secondary tone is not heard separately as such. And if a secondary tone of 1600 is introduced at a magnitude of 10^3, the tones 1600, 1200, and 4000 will be heard. At still higher levels a complex mixture of tones is heard.

To sum up—the tonal background of the drone will have to be analysed in terms of (a) the nature and intensity of the objective tones,

(b) the nature and intensity of subjective tones, (c) phase differences among these tones and (d) the mutual masking of tones by one another.

It is to be emphasised that in all the above description the various factors have been taken as pure tones and all the data are for monaural hearing. But the tones of the *tambūra* are very complex even objectively which fact complicates the matter even more.

The tonal background as supplied by the *tambūra* is unimaginably complex and one wonders whether it will ever lend itself to an exhaustive analysis. But it is this complexity that imparts the intoxicating charm, tenderness and richness to the *tambūra*; and the consonance-dissonance relationships of the various tones used in music will elude any definiteness of description and classification.

Melodic Relationship of the Drone: The position of the drone in a melodic scheme is twofold. It functions as an (a) integrator and (b) as a rest-note.[30]

(a) How is it that we perceive the various pitches and progressions in a melody to have a unity, as a sense of 'belonging' to an emotional structure? How is it that when singing a simple melody we do not go out of tune or tolerate any transposition of the basic key?

I suggest that the mind perceives and maintains a direct relationship of the various pitches in the melody to the key-note (the drone). In other words, the key-note integrates the melodic units into a whole. MEYER has maintained that such a direct relationship is not a necessity in melody.[31] (At this stage the discussion will not be extended to the melodic progression towards the tonic. That aspect will be considered later). MEYER has failed to recognize the two-fold function of the tonic—i.e., as an integrator and as a rest note.

If by the term 'relationship' we do not restrict ourselves to 'pleasantness', it is obvious that every note in a melody has a particular æsthetic relationship to the tonic, pleasant or unpleasant. The æsthetic effects of melody are achieved, then, by various movements from the unpleasant to the pleasant– from excitation to repose and *vice versa*. And this is done by a comprehension of both the relationship of contiguous notes and the relation to the tonic. *So long as such a relationship is not perceived, no melodic music is possible, for then it will have no integration.*

This relationship is primarily a psychological one, which is indicated by the fact that we do not go out of tune even when singing without an accompanying drone (provided the melody is a fairly simple one). When this psychological base is externalised it becomes the drone, which is essential for more complicated melodic music.

How the exact auditory mechanism for the perception of such a relationship is developed is not clear. Perhaps, some such mechanism as suggested by WUNDERLICH[32] is involved, which I am here trying to extend to the integrating function of the drone. Briefly, it is this :— Consider two tones f_1 and f_2. As far as the basilar membrane is concerned, they may be related in two ways : (i) proximally, when the tone f_2 stimulates the basilar regions close to those stimulated by f_1; (ii) harmonically, when some of the harmonics of f_2 stimulate the same area as stimulated by f_1 and its harmonics. Such are the neural relationships of the two tones. In tones related as fifths every third spot activated by f_1 will be activated by f_2. This neural *pattern* gradually acquires a psychological existentiality of its own, without reference to the specific tones f_1 and f_2 as the specific ends of a two-tone melody. By the inversion, transposition and regrouping of such a pattern new patterns and therefrom new 'organizations'[33]—proximal and harmonic—may be evolved which in their turn acquire an existentiality of their own.[34] In the above case the 'organization' has been derived from harmonic relationship; similarly proximal patterns may develop into various types of 'organizations'. It is such organizations, perhaps, that we perceive as musical scales with certain physical and psychological relationships.

Such an organization is *constantly and dynamically* operative in melodic music with regard to the key-note. Otherwise it is difficult to imagine how one keeps in tune; it also explains why transposition is unpleasant in melodic music. So long as one keeps within the limits of the particular perceptual 'organization', one feels the music to be in tune; the moment the limit is crossed—when the music is 'out of tune' or is transposed to another key suddenly—the sensation is one of great discomfort.[35] The base of the whole organization is the tonic, and this gives the melody an æsthetic unity.

(b) A melodic progression is not complete till it resolves itself finally in a rest. This rest is the tonic or the *ādhāra ṣaḍja.*

MEYER has attempted to show—and has succeeded to a great extent —that this progression is one of simple relationships. (How far this sort of simplicity governs Indian music remains to be tested). A melody progresses in such a way that a desire to come back to the tonic is created. This desire may or may not be granted according to the æsthetic necessity of the melody. Tones which have no direct and simple relationship to the tonic are brought into indirect relation to it by another tone (or a series of tones) which is related to this tone and the tonic in a simpler manner. Also a complex melody that finally ends in the tonic may be composed of partial melodies, each with its own tonic. Such tonics become the subsidiary tonics in the melodic

scheme and help to knit the partial melodies into a wider melodic pattern. A subsidiary tonic is termed as the *nyāsa* in Indian music which also recognizes an even more delicate shade of rest in the *apanyāsa*.

Whether the tonic is main or subsidiary, its function in this context is to provide a psychological rest. That is, the mind tries to move towards such tones in an attempt to resolve the excitation caused by the melodic progression. This can be best observed in the *Rāga Mallhār* in which the characteristic movement is the resolution of a dissonant pattern of B♭ – B into C.

This function of the tonic is best illustrated in folk-music. The melodic patterns in folk-music are usually very simple and hence will serve as convenient examples. It will be noticed that in this kind of music (and in *Rāgas* like *Pīlu* and *Punnāga varāli*, which are the most common patterns in folk-music and most probably derived from there) the subsidiary melody ends in a note one higher or one lower than the tonic. This causes an excitation and a strong desire for rest which is resolved by interlacing with it the final melodic piece which comes to rest on the tonic.[36] This phenomenon is further developed in 'classical' music as the leading note. Such leading notes are contiguous to the main or subsidiary tonic; and the melodic movement is led on in such a way that this note comes into prominence. The approach of the tonic is indicated, but never given immediately, creating a strong desire for rest. The excitation is eventually resolved onto the tonic (repose). Of especial importance in such artistic technique are F ♯ and B.

Another very common melodic scheme in folk-music is the one corresponding to the question and answer in the poem sung. The melody carrying the question usually ends on D (Ri), which is a note just above the tonic and hence engendering a desire for rest. This corresponds to the desire for an answer in the poem. And the answer is given in a melody that ends on the tonic.

SUMMARY

The function of the drone is one of helping the resolution of excitement and conflict into rest and repose. This principle is one of the most important in music. The drone achieves this function by (i) serving as a background to the resolution of dissonance into consonance, (ii) being a base onto which the movement away from rest is resolved into a movement onto rest, (iii) functioning as an integrator which binds the whole melody into a psychological and æsthetic organization.

FOOT-NOTES :

1. SANKARAN, C. R. and CHAITANYA DEVA, B., "Postulational Methods and Indian Musicology" Journal of the University of Bombay, Vol. XVIII, Pt. 2, 79 (1949).

2. Ibid.

3. The terms 'drone', 'tonic', and 'key-note' are used synonymously in this paper and signify an unchanging base of reference during singing (cf. also ft. nt. 30). The term tonic does not mean here, "the note on which the scale begins and ends which determines the key of a piece of music either in maj. or min. or in one of the modes (in the latter case, however, it is not called 'key-note')". *Vide*, 'Everyman's Dictionary of Music', BLOM. E., (Dent, 1946), under the word, 'Tonic'. In modern Indian music, singing or playing a *Raga* always starts and finishes on Sa (Do). It is a lack of understanding of the function of the tonic in our music that has led many Western musicologists to the opinion that the Indian musician has no sense of the tonic. Cf., 'it is nevertheless recorded that the Indians have little feeling for anything like a tonic, or for the relative degree of importance in the notes that compose the scale; and there seems little restriction as to which note in the scale may be used for the final close', PARRY, Hubert, "The Evolution of the Art of Music", p. 34 (Routledge and Kegan Paul, 1950).

4. SANKARAN, C. R., "The Problem of the Structure of Vowels and Consonants", BDCRI, IX (1948), p. 191.

5. This introspective analysis seems to be in conformity with the experimental work of ESTHER L. GATEWOOD, *vide* "Effects of Music", Ed. Max Schoen (Kegan Paul, 1927) Ch. V, pp. 115-116. GATEWOOD'S work shows that melody is a associated more with sadness, seriousness, and quiet satisfaction. Cf. also HAMPTON, P. J., "The Emotional Element in Music", Jl. Gen. Psy., XXXIII, 1945, pp. 237 ff.

I am unable to say how far erotic desire is related to this phenomenon of consonance-dissonance. Perhaps, music never expresses an erotic 'need', but only an erotic 'desire'. (I am thankful to Dr. C. R. SANKARAN for this suggestion). I will further qualify this by pointing out that 'need' is a necessity of an organism dependent on its inherited constitution and 'desire' is an acquired want, expressing the memory of frustration and satisfaction. Then, erotic 'desire' is another type of 'pain', a remembered emotion.

6. SEASHORE, CARL E., "Psychology of Music", p. 132 (Mc Graw-Hill, 1938).

7. SCHOEN, MAX (Ed)., "Effects of Music", pp. 46-47, (Kegan Paul, 1927).

8. The only work, that I know of, which discusses the tonal formant of the *tambura* to any extent is G. H. RANADE'S "Hindustani Music", Ch. V (Pub. by the author, Sangli 1938). But RANADE has not emphasized or analysed in detail the subjective tones, which indeed play the greatest role in the building of the tonal background.

9. The F type of tuning in the Southern system is not a replacement of G by F as in the Northern system, but only raising the tonic by a fourth, which is done for singing *Rāgas* like *Jhinjoti* and *Punnāga-varāḷi*. This is also done by North Indian musicians for singing similar *Rāgas*.

I came across a very interesting type of tuning in the Ceded districts (South India). The ballad singer (who sang the Bobbili Katha for me) had tuned his drone, consisting of 3 strings, in the following manner:—C C D♭. This may be considered as B B C but this could not be, as he used the pitch to which the two strings had been tuned same as his drone and rest-note.

10. RANADE, G. H., ibid., p. 65.

11. RAMAN, C. V., "On Some Indian Stringed Instruments", Proc. Ind. Assoc. for Cult. of Sc., VII, 29 ff. (1921-22).

12. Since writing this, Prof. C. R. SANKARAN has given the view of Sir C. V. RAMAN on this question as embodied in the letter the former received from the latter (of date 12th October 1949) to the following effect: "The statements actually made in that paper

on the strength of my (Sir C. V. RAMAN'S) experimental observations may be illustrated by the following examples :

"If the string is plucked at a distance 1/4 from one end, the 4th harmonic is absent in the case of the ordinary sonometer, but it comes out strongly with the Veena. In the latter case, it makes no observable difference in the strength of the 4th harmonic whether the position of the plucked point is $1/4 + \delta$, $1/4$ or $1/4 - \delta$, while δ is a small quantity, whereas in the case of an ordinary sonometer the difference is easily observed.

"I (Sir C. V. RAMAN) did *not* assert that the strength of the harmonic in the Veena or Tambura is the same whether the point of plucking is distant 1/7 or 1/4 or 1/3 or 1/2 or 21/3 from one end. Indeed, there is absolutely no reason for supposing that such would be the case".

The fact that the musician chooses in actual practice a point 2/3 the length of the string from the bridge immediately suggests that he wishes to emphasise the perfect fifth. This fact implies that by selecting a point of plucking the choice of emphasis of any particular harmonic is also made. It appears from Sir C. V. RAMAN'S latest statement quoted above that the musician's observation and practice in this matter are not purely traditionally conditioned psychological habits.

13. An electro-acoustical analysis of the *tambura* will be undertaken shortly in our laboratory (Phonetics Lab., Deccan College Post-Graduate and Research Institute, Poona).

14. STEVENS, S. S. and DAVIS, H., "Hearing", p. 193 ff. (JOHN WILEY, 1947).

See also FLETCHER, H., 'A Space-Time Pattern Theory of Hearing', Jl. of Acou. Soc. Am., I, 311 ff (1930).

15. FLETCHER, H., "Speech and Hearing", p. 178, (VAN NOSTRAND, 1948).

16. FLETCHER, H., "A Space-Time Pattern Theory of Hearing", Jl. Acous. Soc. Am. (JASA) I, 311 ff (1930).

STEVENS and DAVIS, ibid., p. 186.

17. NEWMAN, E. B. et al, "Factors in the Production of Aural Harmonics and Combination Tones", JASA, IX, p. 107 ff.

The questions relevent in this context are: What are the more stable harmonics at the intensities at which *tamburas* are usually played ? Does variation in the intensity of playing the *tambura* affect the timbre of the instrument; if so, to what extent ?

The phenomenon is *not* so simple as illustrated here. When two tones are presented simultaneously, the curves for response are irregular. See pp. 117–118 of the paper of E. B. NEWMAN et al referred to above.

18. WEGEL, R. L. and LANE, C. E., "The Auditory Masking of one Pure Tone by another and its Relation to the Dynamics of the Inner Ear", Phys. Rev., XXIII, 273, (1924). The magnitude of a tone is taken as 'the logarithm of the ratio of its pressure (r.m.s.) to the threshold value', ibid. p. 266.

19. WEVER, E. G., et al, "Origin of Combination Tones", Jl. Expt. Psy. XXVII, p. 222 (1940).

20. WEVER, E. G., et al "Quantitative Studies of Combination Tones", ibid. p. 471. Italics are mine.

21. Ibid., p. 471. The order of combination tone is here defined as: $(m + n - 1)$.

22. Ibid. p. 220. *This was not observed in some animals.

23. NEWMAN, E. B., et al, ibid. p. 116 and table on p. 117. The order of the combination tone is here understood as, 'the number of the highest harmonic entering the combination'.

24. STEVENS and DAVIS, ibid. p. 199–200.

25. FLETCHER, "Speech and Hearing", p. 179.

26. COTTON, J. C., "Beats and Combination Tones between the Unision and the Octave", JASA, VII, p. 44–50.

27. STEVENS and DAVIS, op. cit., p. 205.

See also E. K. CHAPIN and F. A. FIRESTONE, 'The Influence of Phase on Tone Quality and Loudness; the Interference of Subjective Harmonics', JASA, V, 173 ff.

28. WEGEL and LANE, op. cit., p. 266.

29. Ibid. p. 272.

30. The tonic in its melodic relationship as a rest and reference note need not always be the middle C (*madhya* Sa). It is quite possible to have the upper C (*tara* Sa) as the reference note. This may be specially so in primitive music where descending scales are employed. See DANIELOU, Alain, 'Northern Indian Music' Vol. I, p. 23 (Christopher Johnson, London and Visva Bharati, Calculta, 1949), and SACHS, Curt, 'The Rise of Music in the Ancient World, East and West', p. 50 (Norton, N. Y., and Dent, London, 1943).

31. MEYER, MAX, "Elements of a Psychological Theory of Melody", Psychol. Rev. VII, p. 258 (1900).

MEYER considers *relationships* of simple types, definable in simple arithmetical ratios. In this paper, the term 'relationship' is given a wider connotation signifying a tonal relation whether it be simple or complex. Meyer confined his discussion only to 'relationships' of 'pleasantness' and arithmetical simplicity and hence his assertion that there need not be a direct relationship between a note and the tonic in the melody. But this does not lead us very far and we will have to widen the implications of 'relationship' to include all psycho-physical relations that have any aesthetic significance. For this wider sense of the term will be of great help in understanding the melodic significance of one *sruti* intervals.

32. WUNDERLICH, H., "Theory of Tonality", Jl. Gen. Psy. XXXVII, 169–176.

See also STEVENS and DAVIS, op. cit., p. 97 ff., for the basilar mechanics of comparison of pitches of tones; and BORING, E. G., 'The Physical Dimensions of Consciousness', p. 165 ff (Appleton-Century, 1933).

33. WUNDERLICH, ibid. p. 172.

34. Since writing the above, I have had the benefit of yet another illuminating discussion with Dr. C. R. SANKARAN and wish to add the following to what has been written:

The term *existentiality* is here used in a psychologistic sense. The *relationship*, which is an 'abstraction', is *not* 'unreal' or 'non-existent'. It possesses an existence like the Alpha-phoneme which is purely a relational concept and a mathematical fiction. (See, SANKARAN, C. R., "A Note on the Epistemological Implications of the Alpha-phonoid Theory"—to be published).

Such an organization is *dynamic* and psychologically real. Every particular phenomenon in such an organization has a particular relational significance to every other constitutive phenomenon in the organization. Each phenomenon has again a relational significance to phenomena in other organizations. What is in unity in one organization may or may not be so in another organization. Analogously, what is aesthetically allowable in one melodic organization may or may not be allowable in another melodic organization. This leads to the assumption that within the frame of the psychology of music too there is a real 'transformation' from one observer to another equivalent observer. (Cf. SANKARAN, C. R. in the forthcoming monograph on "The Study of Old Tamil Phonemics", wherein he has referred to E. A. MILNE'S "Kinematic Relativity".).

Cf. in this connection :—"Pure duration is the form which the succession of our conscious states assumes when our ego lets itself *live*, when it refrains from separating its present state from its former states. For this purpose it need not be entirely absorbed in the passing sensation or idea; for then, on the contrary it would no longer *endure*. Nor need it forget its former states ; it is enough that, in recalling these states, it does not set them alongside its actual state as one point alongside another, but forms both the past and the present states into an organic whole, as happens when we recall the notes of a tune, melting, so to speak, into one another. Might it not be said that, even if

these notes succeed one another, yet we perceive them in one another, and that their totality may be compared to a living being whose parts, although distinct, permeate one another just because they are closely connected? The proof is that, if we interrupt the rhythm by dwelling longer than is right on one note of the tune, it is not its exaggerated length, as length, which will warn us of our mistake, but the qualitative change thereby caused in the whole of the musical phrase. We can thus conceive of succession without distinction, and think of it as a mutual penetration, an interconnection and organization of elements, each one of which represents the whole, and cannot be distinguished or isolated from it except by abstract thought", BERGSON, Henri, "Time and Free Will", pp. 100-101; (George Allen & Co., 1913). (I am once again thankful to Dr. C. R. SANKARAN for bringing to my notice the strikingly parallel and apt remarks of BERGSON, bearing on our discussion here).

Compare:—'......it is a great mistake to correlate these co-ordinations to certain *specific areas or centres* at all. Meaningful-consciousness cannot correlate to centres because it is an *activity, a dynamic change which would perhaps correspond to irradiations of impulses between the various neural levels*'. KALI PRASAD, 'The Psychology of Meaning', p. 104, (University of Lucknow, 1949).

35. This unpleasantness itself may be used as an aristic technique. For example, in singing *Tumri* and *Ghazal* consecutive semitones are often introduced with very fine effect, when they are the least expected, i.e., when they are least expected within the limits of the organization.

Further such transpositions are not very disagreeable when they are of a fourth or a fifth. This can be tried by singing *Rāgas* which employ either the perfect fourth or the perfect fifth—*Mālkaus*, which has no fifth, first in a natural key and suddenly shifting the base to F. For this purpose the *tambura* must be tuned as in the "Hindustani" style of music.

36. Observe, for example the snake charmer's tune. The tune constantly circles round the tonic which is never reached when expected. Quick movements ending on B♭ and moving to D♭ and E♭ or sudden jumps to F are the melodic movements. The repeated *nyasa* on B♭ and the melodic movement clinging close to the tonic creates an almost maddening desire for rest which is given only at the end of a melodic unit.

See also SACHS, Curt, 'The Rise of Music in the Ancient World, East and West', p. 35 (Norton, N. Y., Dent, London 1943).

Table of notation used:—

Name of the note according to

HINDUSTANI SYSTEM	CARNATIC SYSTEM	SYMBOL IN WESTERN MUSIC	SYMBOL USED HERE
Sadja	Sadja	C	Sa
Komal Rishabha	Suddha Rishabha	B♭	ri
Suddha ,,	Catus-sruti ,,	D	Ri
Komal Gandhara	Sadharana Gandhara	E♭	ga
Suddha ,,	Antara ,,	E	Ga
Suddha Madhyama	Suddha Madhyama	F	Ma
Tivra ,,	Prati ,,	F♯	ma
Pancama	Pancama	G	Pa
Kom. Dhaivata	Suddha Dhaivata	A♭	dha
Suddha ,,	Catus-sruti ,,	A	Dha
Kom. Nisada	Kaisiki Nisada	B♭	ni
Suddha ,,	Kakali ,,	B	Ni

A dot below the symbol indicates lowering by an octave; and a dot above, indicates raising by an octave.

QUANTITATIVE CLASSIFICATION OF LANGUAGES

(With 9 graphs and 6 Tables)

By

C. R. SANKARAN, A. D. TASKAR & P. C. GANESHSUNDARAM

[*Abstract* : The paper is an attempt at reshuffling the mixed data furnished by KROEBER and CHRETIEN in their work on quantitative classification of Indo-European Languages by our separating *phonology* from *morphology*. The preliminary results of our investigations are presented showing derangements in the correlation coefficients of the data of KROEBER and CHRETIEN. We confine ourselves in our investigations here only to the KROEBER-CHRETIEN data, subjecting them to a critical examination.

Our investigations are presented here against the back-ground of the concept of *Ethno-psychology*, indicating thereby that a more perfected statistical technique as applied to classification of languages may ultimately lead to the discovery of deeper psychological laws governing all human speech from a dynamic point of view.*]

A. L. KROEBER and C. D. CHRETIEN have attempted to demonstrate that strictly quantitative[1] methods (of mathematical statistics) could be applied for the determination of the degree of similarity of the genetically related languages included in any one family. They operated with the well-known Indo-European family.[2] Their application of the statistical technique, as they claim, very remarkably appears not merely to confirm the results already arrived at by the comparative method evolved by the Indo-Europeanists, which serves as the bed-rock of modern linguistic methodology,[3] but also seems to confirm the view, as they contend, held by scholars like E. H. STURTEVANT who take their stand on the strictly rigorous mathematico-logical discipline[4] of linguistics, that Hittite is cognate with the P I E itself.[5] It therefore appears that the validity of the application of the statistical methods of purely linguistic phenomena seems to have been effectively demonstrated already by KROEBER and CHRETIEN. Over eight years ago it occurred to the senior author of this paper that in order to further ensure the validity of such a procedure, the very statistical technique applied to linguistic phenomena as done by KROBBER and CHRETIEN should be subjected to a still deeper and closer examination. Such an idea entails the separation of *morphology and phonology* from the mixed data of KROEBER and CHRETIEN, and finding out their separate coefficients.[6] This seems to lead to many new ideas in quite an unexpected manner

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* Cf. Gunnar SVENZON. Direct and Indirect Action with Special Reference to Topological Representation, *The Journal of Gen. Psychology*, 1947, 37, pp. 45–59.

about many a linguistic phenomenon, of which it has been so far supposed that the comparative method already referred to above has said almost the last word. In the present paper, only the preliminary results of our investigations in regard to our re-examination of the KROEBER-CHRETIEN method are presented.

We venture to throw an interesting suggestion that the perfected statistical technique resulting from our re-examination of the original data of KROEBER and CHRETIEN, may with advantage be applied to the region defined as *Ethno-psychological*.

There are certain languages whose phonological features might present patterns like the two illustrative languages of C and D of SAPIR.[7] At first sight we might be tempted to speculate genetically with regard to these languages and conclude on general principles that the pattern resemblance between them is an index of genetic relationship.[8] But we must be very guarded in yielding to this temptation, for only a *very small number* of phonological features among languages which might present patterns like C and D can really go to establish genetic relationship between the languages under discussion. Again while a majority of regular parallelisms in *concrete* morphological systems or in coherent parts of them might go to establish genetic relationship between any two languages, a certain *very small number* of regular parallelisms in concrete morphological systems (as well as perhaps a few *general morphological procedures* also) may *not* indicate genetic relationship between the languages under discussion and therefore are necessarily beyond the comparative method. It follows therefore, as a corollary that all that appear as very regular parallelisms even in the *concrete* morphological systems cannot be taken as definite criteria for the determination of the genetic relationship between any two languages i.e. there may be a small residuum (however small it be) among what on the surface appear to be very regular parallelisms even in the features (features, which are not general procedures as inflexion or deflexion, but *concrete* forms found actually existing) belonging to the *concrete* morphological systems—where we cannot at all operate with the tool of the *comparative method*. It is no doubt possible too that even some general procedures of morphology might perhaps belong to this realm.[9] Thus we are able to *abstract* from the entire range of linguistic phenomena available for objective study, certain *phonological features* and certain very special *morphological features* (to which it may be possible to add a very special type of *syntactical features* also) where the operational efficiency of the *comparative method* might be questioned. This region might well be defined as the realm of "Ethno-Psychology". Linguistic phenomena belonging to this realm require a deeper psychological explanation.[10] The term "ethno-psychology" must not lead anyone to suppose that a correlation between race and language is

sought to be established. It is a fundamental and governing idea in modern linguistics that such a correlation does not exist.[11] Certain speech phenomena among unrelated families of languages, however, do strikingly reveal certain deep-rooted mental habits of the different speech-communities. It is these mental habits which are comprised under the term "ethno-psychology".

From the foregoing, it, therefore, appears that the next logical step after the re-examination of the data indicated by KROFBER and CHRETIEN is to extend the use of this tool of mathematical statistics for the study of *convergence* (i.e., an inquiry into how often *unrelated*[12] languages independently develop similar features).[13] The orthodox *comparative method* does certainly fail to operate[14] in this region as it has undoubtedly failed until very recently when 'primeval relationship' and 'borrowing' were thought to be entirely two distinct concepts.[15]

The problem of ethno-psychological features bristles with an immense possibility in that it might be fruitful to apply the rigorous statistical methods for the discovery of the fundamental psychological laws[16] governing human speech. To this end the problem will have a methodological importance, and in such a light the preliminary results of the re-examination of the data of KROEBER and CHRETIEN, presented by us here, acquire a special value. The concept of *primeval relationship* has at its basis the assumption of genetic relationship of the prehistoric languages (reconstructed *Ursprachen*). The assumption that the pre-historic languages (of course, when we analogously operate with them as when we deal with the concept of primeval relationship) were wholly unrelated (in a purely genetic sense) lies at the basis of the concept of 'borrowing'.[17] These were the concepts of the early neo-grammarians. But, what at first sight might seem to be most difficult for analysis is an assumption which can be formulated in the following manner :

"Certain pre-historic languages were neither *wholly related* nor *wholly unrelated*".[18]

This is the only assumption that explains satisfactorily certain facts found in primitive languages which have happily survived to this day. In the complex world of actual linguistic history, there cannot be drawn sharp lines between some prehistoric languages as certain linguistic facts do not work out along neatly schemetic lines.[19] Any language is a complicated network of dialects which it comprises of, intercrossing one another.[20] The frame of any language with its complicated system of dialects forming a complex network resembles "a texture of world lines structuring a continuum".[21] This is particularly pointed out by the investigations of eminent scholars like Hugo SCHUCHARDT, Franz BOAS and C. C. UHLENBECK.[22]

Following MALINOWSKI,[23] here also we are led to observe that ethno-psychological features require a deeper explanation than any which would confine itself to merely grammatical relation. Indeed on the basis of psychological analysis alone certain difficulties associated with what appear to be exclusively linguistic problems could be solved.

Some ethno-psychological features in Dravidian have already been dealt with by C. R. SANKARAN and G. S. GAI.[24] C. C. UHLENBECK also discussed certain special agreements between the Wiyot and Yurok[25] and points out that these features are purely of an ethno-psychological kind, whose parallels might eventually be traced in wholly unconnected families of languages spoken in other parts of the world. For, ethno-psychological features comprise phonological, morphological and syntactical deep-rooted parallelisms (not superficial) between entirely unrelated (in a purely genetic sense) families of human languages. There are such parallelisms between Dravidian and African,[26] Dravidian, Basque and Caucasian,[27] Dravidian and Sumerian,[28] Indo-European and Eskimo[29] and even many more such parallelisms may naturally exist between the reconstructed *Ursprachen* of different *unrelated* languages.[30]

Now in the following pages we are presenting the preliminary results of our investigations concerning the re-shuffling of KROEBER-CHRETIEN data as has been outlined above, separating *morphology* and *phonology* with a view to show the possibility of investigations into new regions of enquiry such as ethno-psychology, by means of a resulting perfected statistical technique applicable for classifying languages.

Prior to the investigations of KROEBER and CHRETIEN, Jan CZEKANOWSKI operated with nine Indo-European languages with the method of differential diagnosis; he established quantitative correlation determinations with his list of 22 elements.[31] His statistical treatment affirmed the well recognised Italo-Celtic, Balto-Slavonian and Indo-Iranian groups. The number of elements chosen here are obviously inadequate. Also, the essential feature of randomness in applying statistical technique has to be well considered. These considerations led KROEBER and CHRETIEN to study the quantitative classification of Indo-European languages,[32] with a random[33] selection of 74 elements. But it must be remembered that KROEBER and CHRETIEN followed the same technique as Jan CZEKANOWSKI.[34]

The coefficients of KROEBER and CHRETIEN agreed well with the geographical distribution of the languages they operated on. Nevertheless, they felt that the sample method is not likely to be satisfactory with such a limited number of elements.[35] Albeit their sample is a random one, they felt the need at the outset, in order to get the significant results, for listing[36] all the elements of the parent Indo-European which have to be operated upon, as they proceeded with the

application of X^2 test with 'Null hypothesis' as the basis giving a significance only of ten values out of all the 45 (two by two combinations) with ten languages.[37] This discrepancy may not be due merely to the choice of the limited number of elements or the limitations of the technique, but due to the 'inherent' character of the elements of their choice. The kind of influence that one language can exert on another is the free borrowing of either the one of the two sets of features or both the sets—morphological and phonological—as all the elements of their choice can be broadly classified into two sets, namely, *morphological* and *phonological*. Any two languages if related in some way with each other may either be more closely connected from the point of view of morphology or phonology, or both to an equal degree.[38]

It is clear that even where there is a striking morphological similarity, until definite phonetic shifts can be proved through a consideration of a large number of parallel forms, and until an exhaustive comparison of vocabularies has been made, a vast array of stems of the two languages in question cannot be identified. Indeed SAPIR goes even far beyond when he maintains that "the psychology of phonetic processes is unintelligible unless the general patterning of speech sounds is recognized...... The most important phase of sound patterning is the inner configuration of the sound system of a language, the intuitive 'placing' of the sounds with reference to one another".[39]

These relations are not easy to determine statistically. However, it was felt as indicated in the earlier part of this paper that it will be useful to divide the 74 elements as listed by KROEBER and CHRETIEN into two sets (morphological and phonological).[40]

In the following pages the same relations as those which formed the subject matter of KROEBER and CHRETIEN's investigations are studied and the same technique as theirs is also applied, but only the point of view is different. Our method in essence is thus not different from that adopted by KROEBER and CHRETIEN.[41] In our tabulation the values of *a*, *b*, *c*, *d* for each pair of language-groups are given separately for phonology and morphology unlike as in the procedure adopted by KROEBER and CHRETIEN, where the values of *a*, *b*, *c*, *d* for each pair of language-groups comprise together phonology and morphology without any separation. In both the procedures *a* means the number of elements common to both the languages, *b*, the number present in one and absent in the other, *c*, the number absent in the first and present in the second and *d*,[42] the number absent in both. While the procedure of KROEBER and CHRETIEN operates with the combination of phonological and morphological elements, the one set being not separated from the other, our procedure entails the separation of the one set from the other. This marks the essential difference of our procedure from that of

KROEBER and CHRETIEN. Obviously our procedure therefore involves a far greater number of operations than that of KROEBER and CHRETIEN.

Now, substituting the values of a, b, c and d in the appropriate formula of association Q_6 given by,

$$Q_6 = \sin\{(\pi/2)[(ad-bc)/\sqrt{(a+b)(a+c)(b+d)(d+c)}]\}$$

we computed the coefficients separately from both the sets of morphology and phonology. These numerical results it is presumed, represent the relative degree of association of one language-group (like Italo-Celtic) with yet another (Balto-Slavic).

Phonology (Table 1)

	Ce	It	Gk	Ar	Ir.	Sk	Sl	Ba	Ge
1	−	−	−	−	+	+	−	−	−
2	−	−	−	−	+	+	−	−	−
3	−	−	−	−	+	+	−	−	−
7	−	−	+	+	−	−	−	+	+
8	+	+	−	+	−	−	−	+	+
9	+	+	−	−	−	−	−	−	−
20	−	−	−	+	+	+	+	+	−
21	−	−	−	+	+	+	+	+	−
22	−	−	−	−	+	+	+	+	+
23	−	+	+	+	−	−	−	−	−
24	−	−	−	−	−	−	−	+	+
25	+	−	−	−	+	+	+	−	−
27	−	−	−	+	+	−	+	+	+
28	?	+	+	(+)	(+)	−	(+)	(+)	(+)
29	−	−	−	−	−	+	−	−	−
30	−	−	−	−	+	−	+	+	+
31	−	−	−	−	−	+	−	−	−
32	+	−	−	+	+	−	+	+	−
33	−	+	+	−	−	−	−	−	+
34	−	−	+	(+)	+	+	(−)	−	−
35	−	−	(−)	+	−	−	(+)	−	−
36	+	+	(−)	−	−	−	(+)	+	+
37	−	−	+	(−)	+	−	−	−	+
38	−	−	−	?	+	+	−	−	−
39	−	−	−	?	−	−	+	(+)	−
40	−	−	+	+	+	−	−	−	−
41	−	−	−	+	−	−	−	−	+
42	−	−	−	+	−	−	−	−	+
18	−	−	−	+	−	−	+	+	−
26	−	−	+	?	+	+	+	+	−

Morphology (Table 2)

	Ce	It	Gk	Ar	Ir	Sk	Sl	Ba	Ge
4	+	−	−	+	+	+	−	−	−
5	−	−	−	−	+	+	−	−	(+)
6	−	−	−	−	+	+	−	−	−
10	+	+	−	−	−	−	−	−	−
11	+	+	−	−	−	−	−	−	−
12	+	+	−	−	−	−	−	−	−
13	+	+	−	−	−	−	−	−	−
14	+	+	−	−	−	−	−	−	−
15	+	+	−	−	−	−	−	−	−
16	+	+	−	−	−	−	−	−	−
17	+	+	−	−	+	+	+	+	−
19	−	−	−	−	−	−	+	+	+
43	−	−	+	+	+	+	−	−	−
44	−	−	+	?	+	+	−	−	−
45	+	+	−	−	−	−	−	−	+
46	−	−	−	−	−	−	+	+	−
47	−	−	+	(+)	+	+	−	−	−
48	+	+	−	−	−	−	−	−	+
49	−	−	−	−	−	−	+	+	−
50	−	−	−	+	−	−	+	+	−
51	+	+	−	−	−	−	−	−	+
52	−	−	+	−	+	+	−	−	−
53	−	−	+	−	+	+	+	+	−
54	−	−	−	−	−	−	−	−	+
55	+	+	−	−	−	−	−	−	−
56	+	+	+	−	+	+	+	−	−
57	−	−	+	−	−	−	−	+	+
58	+	−	+	−	+	+	−	−	−
59	−	+	−	−	−	−	−	−	+
60	−	−	−	+	−	−	+	−	−
61	−	+	+	+	−	−	−	−	−
62	+	+	−	−	−	−	−	−	−
63	−	−	−	−	+	−	−	−	+
64	−	−	+	+	−	+	+	+	−
65	−	−	−	−	+	+	+	+	−
66	−	+	−	−	−	−	−	+	+
67	+	+	+	−	−	−	−	−	−
68	−	−	−	(−)	−	−	+	+	+
69	−	−	−	+	+	+	+	+	−
70	+	+	+	−	−	−	−	−	+
71	+	+	+	−	−	−	+	+	−
72	−	+	+	−	−	−	−	−	−
73	−	+	+	−	−	−	−	−	−
74	+	+	−	−	+	+	+	+	+

Phonology (Table 3)

	a	b	c	d	N	Q_s	χ^2
Celt-Ital.	3	2	2	22	29	0.73	7.741
,, -Grk.	0	5	7	17	29	–0.39	1.845
,, -Arm.	2	3	11	10	26	–0.15	0.248
,, -Iran.	2	3	13	11	29	–0.17	0.333
,, -Sans.	1	4	11	13	29	–0.31	1.138
,, -Slav.	3	2	9	15	29	0.27	0.864
,, -Balt.	3	2	10	14	29	0.27	0.562
,, -Germ.	2	3	9	15	29	0.03	0.011
Ital-Grk.	3	3	5	19	30	0.40	2.088
,, -Arm.	3	3	11	10	27	–0.03	0.010
,, -Iran.	1	5	15	9	30	–0.55	4.051
,, -Sans.	0	6	12	12	30	–0.60	5.000
,, -Slav.	2	4	11	13	30	–0.16	0.305
,, -Balt.	3	3	11	13	30	0.06	0.050
,, -Germ.	4	2	8	16	30	0.41	2.222
Grk-Arm.	5	2	9	11	27	0.35	1.396
,, -Iran.	5	3	11	11	30	0.17	0.396
,, -Sans.	2	6	10	12	30	–0.29	1.023
,, -Slav.	2	6	11	11	30	–0.34	1.493
,, -Balt.	3	5	11	11	30	–0.17	0.368
,, -Germ.	4	4	8	14	30	0.19	0.455
Arm-Iran.	7	7	7	6	27	–0.06	0.040
,, -Sans.	3	11	7	6	27	–0.50	3.038
,, -Slav.	7	7	4	9	27	0.30	1.033
,, -Balt.	8	6	4	9	27	0.40	1.899
,, -Germ.	6	8	6	7	27	–0.05	0.030
Iran-Sans.	10	6	2	12	30	0.70	7.232
,, -Slav.	9	7	4	10	30	0.42	2.330
,, -Balt.	8	8	6	8	30	0.11	0.153
,, -Germ.	5	11	7	7	30	–0.29	1.094
Sans-Slav.	5	7	8	10	30	–0.04	0.023
,, -Balt.	4	8	10	8	30	–0.34	1.430
,, -Germ.	1	11	11	7	30	–0.74	8.356
Slav-Balt.	11	2	3	14	30	0.82	13.275
,, -Germ.	5	8	7	10	30	–0.04	0.021
Balt-Germ.	8	6	4	12	30	0.49	3.214

Phonology (Table 4)

	Celt	Ital	Grk	Arm	Iran	Sans	Slav	Balt	Germ
Celt.	1.00	0.73	–0.39	–0.15	–0.17	–0.31	0.27	0.27	0.09
Ital.	0.73	1.00	0.40	–0.03	–0.55	–0.60	–0.16	0.06	0.43
Grk.	–0.39	0.40	1.00	0.35	0.17	–0.29	–0.34	–0.17	0.11
Arm.	–0.15	–0.03	0.35	1.00	–0.06	–0.50	0.30	0.40	–0.05
Iran.	–0.17	–0.55	0.17	–0.06	1.00	0.70	0.42	0.11	–0.29
Sans.	–0.31	–0.60	–0.29	–0.50	0.70	1.00	–0.04	–0.34	–0.74
Slav.	0.27	–0.16	–0.34	0.30	0.42	–0.04	1.00	0.82	–0.04
Balt.	0.27	0.06	–0.17	0.40	0.11	–0.34	0.82	1.00	0.49
Germ.	0.03	0.41	0.19	–0.05	–0.29	–0.74	–0.04	0.49	1.00

Morphology (Table 5)

	a	b	c	d	N	Q_s	χ^2
Celt-Ital.	18	2	5	19	44	0.89	20.919
,, -Grk.	5	15	10	14	44	–0.07	0.084
,, -Arm.	1	19	7	16	43	–0.49	4.570
,, -Iran.	5	15	10	14	44	–0.27	1.349
,, Sans.	5	15	10	14	44	–0.27	1.349
,, Slav.	4	16	10	14	44	–0.36	2.361
,, Balt.	3	17	11	13	44	–0.49	4.781
,, Germ.	5	15	8	16	44	–0.14	0.364
Ital-Grk.	7	16	8	13	44	–0.13	0.287
,, -Arm.	1	22	7	13	43	–0.58	6.637
,, -Iran.	3	20	12	9	44	–0.67	9.501
,, -Sans.	3	20	12	9	44	–0.67	9.501
,, -Slav.	4	19	10	11	44	–0.49	4.623
,, -Balt.	4	19	10	11	44	–0.49	4.623
,, -Germ.	7	16	6	15	44	0.03	0.018
Grk-Arm.	4	10	4	25	43	0.28	1.362
,, -Iran.	7	8	8	21	44	0.30	1.602
,, -Sans.	8	7	7	22	44	0.44	3.750
,, -Slav.	4	11	10	19	44	–0.12	0.278
,, -Balt.	4	11	10	19	44	–0.12	0.278
,, -Germ.	2	13	11	18	44	–0.39	2.874
Arm-Iran.	4	4	10	25	43	0.28	1.362
,, -Sans.	5	3	9	26	43	0.46	4.013
,, -Slav.	4	4	10	25	43	0.28	1,362
,, -Balt.	3	5	11	24	43	0.07	0.113
,, -Germ.	0	8	13	22	43	–0.55	5.963
Iran-Sans.	14	1	1	28	44	0.99	35.549
,, -Slav.	6	9	8	21	44	0.20	0.702
,, -Balt.	5	10	9	20	44	0.03	0.024
,, -Germ.	3	12	10	19	44	–0.23	0.996

	a	b	c	d	N	Q_6	χ^2
Sans-Slav.	7	8	7	22	44	0.35	2.313
,, -Balt.	6	9	8	21	44	0.20	0.702
,, -Germ.	2	13	11	18	44	-0.39	2.874
Slav-Balt.	12	2	2	28	44	0.95	27.494
,, -Germ.	3	11	10	20	44	-0.19	0.006
Balt-Germ.	5	9	8	22	44	0.14	0.375

Morphology (Table 6)

	Celt	Ital	Grk	Arm	Iran	Sans	Slav	Balt	Germ
Celt.	1.00	0.89	-0.07	-0.46	-0.27	-0.27	-0.36	-0.49	-0.14
Ital.	0.89	1.00	-0.13	-0 58	-0.67	-0.67	-0.49	-0.49	0.03
Grk.	-0.07	-0.13	1.00	0.28	0.30	0.44	-0.12	-0.12	-0.39
Arm.	-0.49	-0.58	0.28	1.00	0.28	0.46	0.28	0.07	-0.55
Iran.	-0.27	-0.67	0.30	0.28	1.00	0.99	0.20	0.03	-0.23
Sans.	-0.27	-0.67	0.44	0.46	0.99	1.00	0.35	0.20	-0.39
Slav.	-0.36	-0.49	-0 12	0.28	0.20	0.35	1.00	0.95	-0.19
Balt.	-0.49	-0.49	-0.12	0.07	0 03	0.20	0.95	1.00	0.14
Germ.	-0.14	0.03	-0.39	-0.55	-0.23	-0.39	-0.19	0.14	1.00

The nine Indo-European languages considered are Celtic, Italic, Greek, Armenian, Iranian, Sanskrit, Slavic, Baltic and Germanic. These nine separate individual languages represent $(9 \times 8)/2 = 36$ separate relations, for each of which a coefficient of relation is obtained. These coefficients range between theoretical limits from $+1$ to -1. The closer the relation the nearer it approaches $+1$. Conversely, the nearer it approaches -1 the more distant the relationship.

We will now proceed to define certain concepts like *association*, *dissociation* and *independence*.[43] If any two speech communities[44] mutually affect each other, then it is likely that the languages of these two speech communities have a high degree of *association*. Conversely, the languages of any two speech communities which have no mutual influence upon one another are likely to be *independent*. Again if we consider also alien influences and distance of separation both in time and space between any two different languages, each of which does not exercise any influence over the other, and each of which comes under certain distinct exclusive influences, which in the least do not affect the other, then we meet with *dissociation*.[45]

Bearing in mind these definitions of *association*, *dissociation* and *independence*, we turn to interpret our results and see what light it sheds after our division of the total number of the 74 elements into the two sets of phonology and morphology.

I. First we shall examine the coefficients of the morphological elements, comparing them side by side with the coefficients of KROEBER and CHRETIEN. For the sake of convenience and for easy reference, the results are provided here in tabular forms.

(a) High positive coefficients :—

Language Groups.	Our Coefficients.	Coeffs. of Kroeber and Chretien.	χ^2
Celt-Ital.	0.89	0.87	20.919
Iran-Sans.	0.98	0.91	35.549
Slav-Balt.	0.95	0.92	27.494

These are the three high positive coefficients for which the χ^2 values are highly significant. Despite this fact, the coefficients agree with all non-statistical judgments even to the extent of ranking the Italo-Celtic similarity a little lower than Slavic-Baltic and Iranian-Sanskrit.[46]

(b) Other positive coefficients :—

Language Groups.	Our Coefficients.	Kroeber-Chretien Coefficients.	χ^2
Grk-Iran.	0.30	0.22	1.602
Grk-Sans.	0.44	0.28	3.750
Arm-Sans.	0.46	0.05	4.013
Sans-Slav.	0.35	0.20	2.313

It is easily observed that the coefficient obtained by us for Armenian and Sanskrit has a positive value whereas according to KROEBER and CHRETIEN the two languages are almost *independent*.

(c) High negative values :—

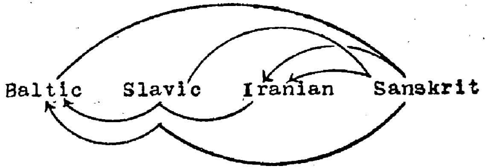
Language Groups.	Our Coefficients.	Kroeber-Chretien Coefficients.	χ^2
Celt-Arm.	–0.49	–0.46	4.570
Celt-Balt.	–0.49	–0.30	4.781
Ital Arm.	–0.58	–0.48	6.637
Ital-Iran.	–0.67	–0.66	9.501
Ital-Sans.	–0.67	–0.63	9.501
Ital-Slav.	–0.49	–0.40	4.623
Ital-Balt.	–0.49	–0.35	4.623
Arm-Germ.	–0.55	–0.18	5.963
Celt-Slav.	–0 36	–0.18	2.361
Grk-Germ.	–0 39	–0.17	2.874
Sans-Germ.	–0.39	–0.54	2.874

General agreement between the two sets of coefficients except for Armenian-Germanic.[47]

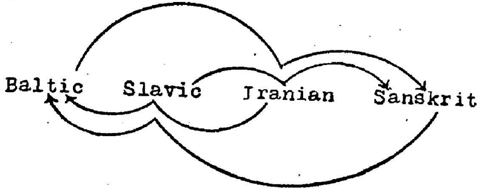
(d) Negligible values :

Language Groups.	Our Coefficients.	Kroeber-Chretien Coefficients.	χ^2
Celt-Grk.	-0.07	-0.25	0.084
Ital-Germ.	0.03	0.11	0.018
Arm-Balt.	0.07	0.28	0.113
Iran-Balt.	0.03	0.12	0.024

Again, Baltic is nearer to Sanskrit (0.20) than to Iranian (0.03).
Slavic is nearer to Sanskrit (0.35) than to Iranian (0.20).
Iranian is nearer to Slavic (0.20) than to Baltic (0.03), and
Sanskrit is nearer to Slavic (0.35) than to Baltic (0.20).
These statements can be diagrammatically represented as follows :



From the KROEBER-CHRETIEN coefficients we obtain the following diagram,



which is in complete agreement with the geographical distribution of the languages unlike our results with respect to morphology. (Cf. our Phonological values for the above languages which agree with the geographical distribution of these languages.)

II. Coming to the Phonological elements, we have again :

(a) High Positive Coefficients ;—

Language Groups.	Our Coefficients.	Kroeber-Chretien Coefficients.	χ^2
Celt-Ital.	0.73	0.87	7.741
Iran-Sans.	0.70	0.91	7.232
Slav-Balt.	0.82	0.92	13.275

These three high positive coefficients strikingly emphasise once again the closeness of the two languages in each of the three groups (Celtic-Italic, Iranian-Sanskrit and Slavic-Baltic).

(b) Other Positive Coefficients :—

Language Groups.	Our coefficients.	Kroeber-Chretien Coefficients.	χ^2
Ital-Grk.	0.40	0.09	2.088
Ital-Germ.	0.42	0.11	2.222
Arm-Balt.	0.40	0.28	1.899
Iran-Slav.	0.42	0.32	2.330
Balt-Germ.	0.49	0.32	3.214

(c) High Negative Values :—

Language Groups.	Our Coefficients.	Kroeber-Chretien Coefficients.	χ^2
Ital-Iran.	-0.55	-0.66	4.051
Ital-Sans.	-0.60	-0.63	5.000
Arm-Sans.	-0.50	0.05	3.038
Sans-Germ.	-0.74	-0.54	8.356

With respect to Armenian and Sanskrit it is observed that our morphological coefficients as well as our phonological ones are in complete disagreement with those of KROEBER and CHRETIEN.

(d) Negligible Coefficients :—

Language Groups.	Our Coefficients.	Kroeber-Chretien Coefficients.	χ^2
Celt-Germ.	0.03	-0.12	0.011
Ital-Arm.	0.03	-0.48	0.010
Ital-Balt.	0.06	-0.35	0.050
Arm-Iran.	-0.06	0.22	0.040
Arm-Germ.	-0.05	-0.18	0.030
Sans-Slav.	-0.04	0.20	0.023
Slav-Germ.	-0.04	-0.11	0.021

To test the significance of the values of the coefficients derived, we applied the χ^2 test, assuming that in a given four-fold table there is no association between any two languages. We then calculated for both the sets the values of χ^2 for each pair of combinations by the formula,

$$\chi^2 = N\,(r_{hk})^2$$

where N denotes the total number of elements.

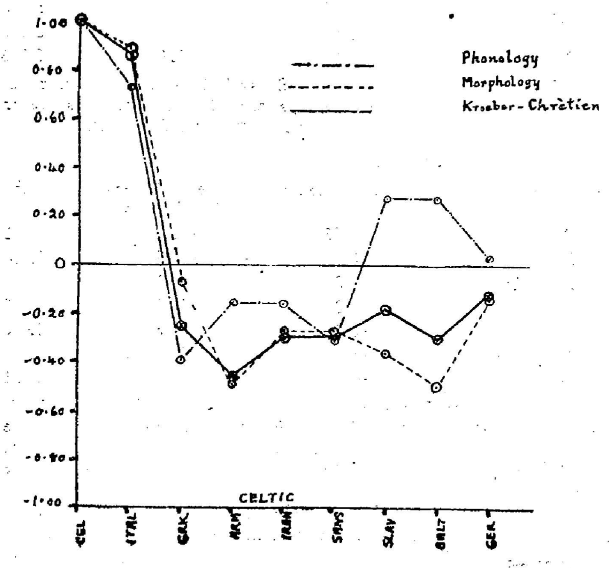
If we draw a conventional line at $P = 0.05$,[48] then values of P greater than 0 05 will not contradict our hypothesis of *independence*, and the languages are independent; and if the value is much less than 0.05 then the result is not in favour of the hypothesis i.e., *dependence* of the languages is evident.

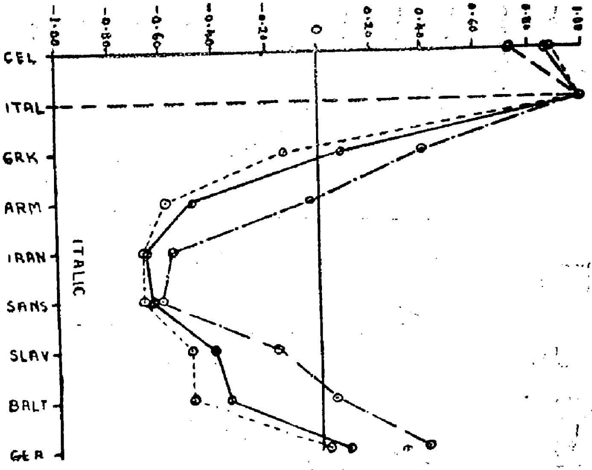
With this criterion in view we get 12 significant values of X^2 for morphology and six for phonology.

As the observed frequencies from both the sets of morphology and phonology in some cases were numbers less than 3, the values of X^2 were recalculated by applying Yate's correction,[49] making the observed frequencies less extreme than they really are by half a unit, but no noteworthy results were obtained.

Graphs

(1)

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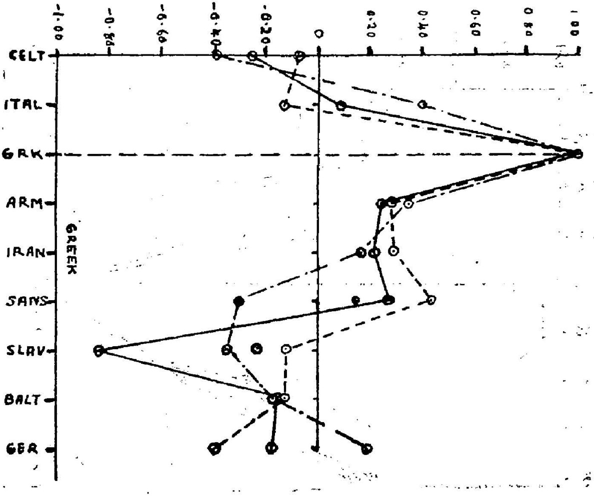
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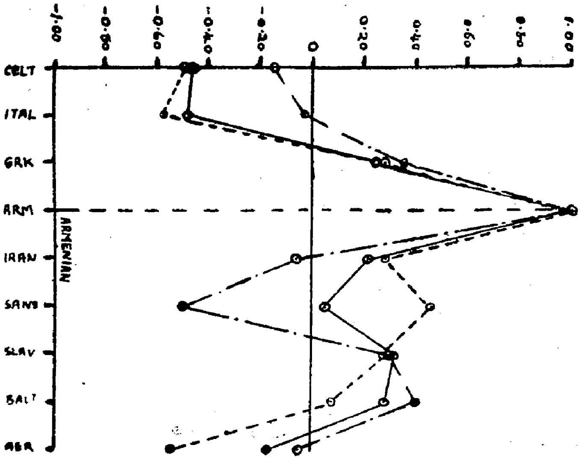

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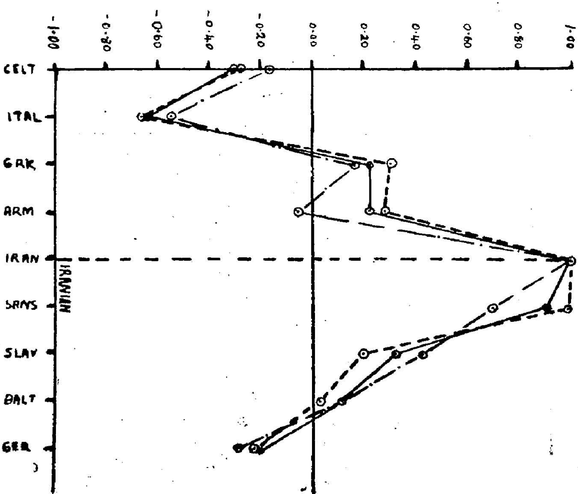

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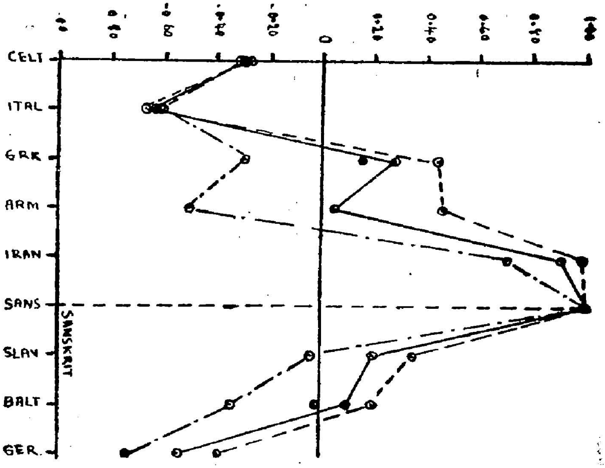
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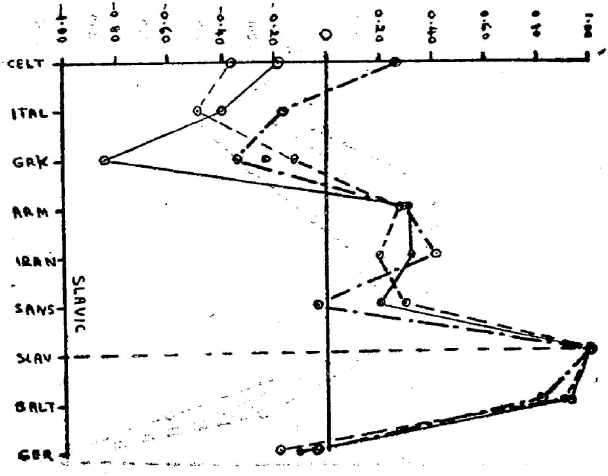
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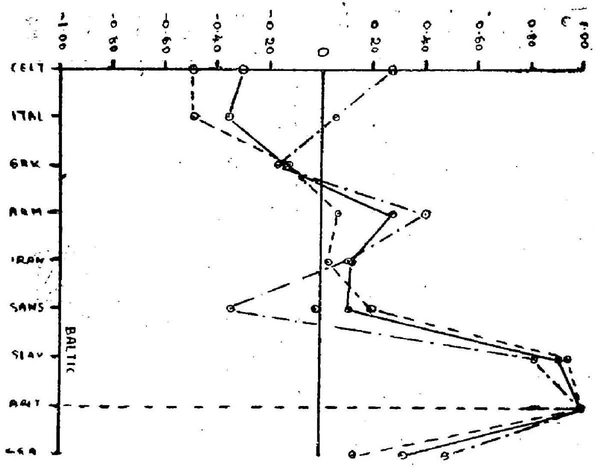

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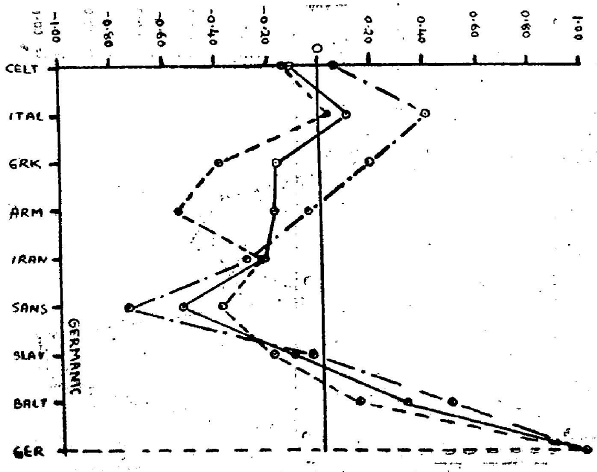

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(9)

The graphs[50] reveal the existence of such closely related groups like Celtic-Italic, Indo-Iranian and Balto-Slavic. A very striking observation that confirms the existence of such a close contact between the two members of each of these three groups (viz., Celtic-Italic, Iranian-Sanskrit and Balto-Slavic) is that the two members of each group have almost the same order of coefficients with respect to other languages. The only exceptional cases are the following :—

Italic has a positive coefficient (phonology) whereas Celtic has negative coefficients (phonology and morphology) with respect to Greek.

The Iranian-Greek coefficient for phonology has a positive value whereas the Sanskrit-Greek coefficient for phonology has a high negative value.

The Slavic-Germanic coefficients are negative, but the Baltic-Germanic coefficients are positive.

From the remaining graphs we observe further that :—

Greek is a separate group which has certain common peculiarities (mostly phonological) with Italic (though the KROEBER-CHRETIEN coefficients indicate that these two groups are almost independent). Our phonological coefficient for Greek-Italic agrees with non-statistical findings.[51]

Greek also reveals certain common peculiarities with Armenian (phonological and morphological), Iranian (phonological and morphological) and Sanskrit (morphological).

The Greek-Sanskrit coefficients for phonology is negative.

Germanic seems to be unique in that it has negative or negligible positive coefficients with respect to the other languages.

These have been the preliminary results of our investigations by the reshuffling of the KROEBER-and-CHRETIEN material, operating on morphology and phonology separately. It is clear that these investigations show the possibility of extending our enquiry, which is the hope of the authors of this paper to achieve, into regions such as Ethnopsychology by means of a resulting perfected statistical technique suitable for application towards the classification of languages in a wider sense of the term.

FOOT-NOTES:

1. The need for a quantitative approach such as the present one will all the more be appreciated with the advent of recent works like Malcolm GUTHRIE'S *The Classification of the Bantu Languages*, Oxford University Press, London-New York-Toronto, 1948, not to speak of the earlier ones of Franz BOAS and others.

2. A. L. KROEBER and C. D. CHRETIEN : Quantitative Classification of Indo-European Languages, *Language*, Vol. XIII, p. 83–103.

A. L. KROEBER and C. D. CHRETIEN : The Statistical Technique and Hattite, *Language*, Vol. 15, pp. 69–71.

A. L. KROEBER and C. D. CHRETIEN : Correction to Quantitative Classification of Indo-European Languages, *Language*, Vol. XIV, p. 289.

C. D. CHRETIEN : The Quantitative Method for Determining Linguistic Relationships —Interpretation of Results and Tests of Significance, *University of California Publications in Linguistics*, Vol. I, No. 2, pp. 11–20.

3. R. G. KENT : Linguistic Science and the Orientalist, JAOS, Vol. 55, 1935, pp. 115–137.

4. Paul RADIN : *The Method and Theory of Ethnology*.

5. Cf. E. H. STURTEVANT : The Pronoun **so, *sa, *tod* and the Indo-Hittite Hypothesis, *Language* Vol. XV, pp. 11–19.

6. C. R. SANKARAN and P. JAGANNATHAN (Meteorological Office, Poona) originated this idea in 1941. They were the first to detect a derangement of the correlation coefficients out of the separation of Phonology and Morphology from the mixed KROEBER and CHRETIEN data. Their results were not published and the present paper is mainly based on those results, originally arrived at by SANKARAN and JAGANNATHAN, which served fittingly as the starting point of our extended investigations here.

7. Edward SAPIR, Sound Patterns in Language, *Language* Vol. I, pp. 37–51 especially pp. 47 ff.

8. SAPIR, *ibid*, p. 47.

9. No doubt modern students of linguistics (of course following the orthodox *comparative method*) like GRAFF (*Language and Languages*, p. 351) recognise that regular parallelisms in *concrete* morphological systems or in coherent parts of them *only generally* go to establish the genetic relationship between any two languages.

10. That certain linguistic phenomena require a deeper psychological explanation is quite evident by the very use of such special nomenclatures as "the emotional dative in Latin *ei* " (E. W. FAY, CQ.5, 195, section 33) and "the infinitive of excitement in Latin" (E W. FAY, AJP. 40, 1919, p. 418).

11. This correlation only refers to the correlation assumed by scholars in the earlier part of the 19th century. But it is shown that a new meaning can be given to such a correlation and therefore may be assumed to exist really, vide L. KAISER, The Shape of the Palate and its Effect on Speech Sounds, *Proc. of the II Internat. Congress of Phonetic Sciences*, pp. 22–27. For further elucidation on this point we also quote L. KAISER from yet another paper (*Archives Néerl. de Phonétique Expérimentale*, Tome 12, p. 102):—

"The palate probably shows racial differences, because its shape is hereditary to a certain amount. Outward influences are of great importance for the shape of the palate. The various dimensions of the palate are in a different degree bound to one or the other influence. Diminishing influence of heredity, increasing influence of surroundings they show in the sequence : length, molar breadth, premolar breadth, height. The outward influences are not occasional but for a great deal are pathological influences in connection with the type of the subject". (L. KAISER, Speech Organs and Speech, ANPE. 12, pp. 92–118).

12. Obviously this *unrelatedness* here refers to a concept which is the opposite of 'genetic relationship', *relatedness* being used in a narrow and restricted sense. (Contra. foot-note 18 and also foot-note 38).

13. A. L. KROEBER and C. D. CHRETIEN, The Statistical Technique and Hittite, *Language* Vol. 15, 1939, p. 71. See also A. L. KROEBER, *Anthropology*, 1923, pp. 124–125.

14. The terms 'operate' (or 'operation') and 'concept' are synonymous. Cf. "We mean by any concept nothing more than a set of operations; *the concept is synonymous with the corresponding set of operations*", P. W. BRIDGMAN, *The Logic of Modern Physics*, New York, The Macmillan Co., 1928, p. 5.

15. C. C. UHLENBECK, The Indogermanic Mother Language and Mother Tribes Complex, *American Anthropologist*, Vol. 39, p. 390 (1937).

16. Cf. in this connection Wilhelm WUNDT, *Völkerpsychologie*, II Band, *Die Sprache*.

17. As obviously is the case when we operate with the similar historic and living languages (i.e. of like category).

18. The formulation in this form is due to C. R. SANKARAN.

This formulation is akin to that of *selective subjectivism* of EDDINGTON. Cf.:

"In our view the physical universe is neither wholly subjective nor wholly objective —nor a simple mixture of subjective and objective entities or attributes". EDDINGTON, *The Philosophy of Physical Science*, Cambridge, at the University Press, 1939, p. 27.

19. E. SAPIR, Sound Patterns in Language, *Language* Vol. 1, 1925, p. 47.

20. L. BLOOMFIELD, *Language*, pp. 476–495 on Dialect Borrowing. Also L. BLOOMFIELD, *Linguistic Aspects of Science*, pp. 21–33. See also E. SAPIR, *Language*, pp. 105 ff.

21. We think that this phraseology is due to Bertrand RUSSELL, although we are not able to trace its exact source.

Cf. also for this conception of such a complicated frame of reference in Linguistics, L. BLOOMFIELD, *Linguistic Aspects of Science*, p. 54.

22. C. C. UHLENBECK, *American Anthropologist*, Vol. 39, 1937, p. 390.

23. OGDEN and RICHARDS, *Meaning of Meaning*, Supplement I, Kegan Paul, London, 1936, p. 302.

24. C. R. SANKARAN and G. S. GAI, Some Ethno-psychological Features in Dravidian, BDCRI, Vol. II, 1940, pp. 208–211. Also, The Methodological Importance of the Concept of 'Ethno-Psychology' in Modern Linguistics, *New Indian Antiquary*, Vol. VI, 1944, pp. 283–286.

25. C. C. UHLENBECK, Grammatische Invloed van het Algonkisch op het Wiyot en het Yurok, *Mededeelingen der Koningl. Nederl. Akademie van Wetens.*, Nieuwe Reeks, Deel 2, No. 3, pp. 41–49, especially pp. 47–48.

26. J. MAYER, Dravidische Nominal Suffixe und ihre Afrikansche Parallelen, *Bibliotheca Africana*, I, 1924, pp. 44–56.

27. N. LAHOVARY, Aperçus Nouveaux sur des Rapports Insoupçonnées du Basque et des Langues Dravidiennes, etc., Publicado en el Boletin de la Real Academia de Buenas Letras de Barcelona, XXI, 1948, pp. 197–245. The following passages from this paper are especially interesting:

Page 239–40: "*Liste récapitulative à titre d'exemples non limitatifs, de quelques-unes des particularités de structure, de phonétique et de grammaire communes au Basque et Dravidien*:

(1) Absence originaire de la consonne f, en Basque comme dans les langues Dravidiennes.

(2) Exclusion (après introduction ultérieur de f) de f et de r, au début des mots.

(3) Emploi analogue, par voie de conséquence, d'une voyelle antécédante dite prothétique.

(4) Repugnance analogue quant à l'emploi de consonnes finales, comme p, n, g (k) etc. (cela a trait surtout aux états anciens).

(5) Terminaison vacalique des syllabes ou des racines verbales dans les deux langues, surtout anciennement.

(6) Existence analogue de plusieurs r médianes de valeur phonétique différente.

(7) Interchangeabilité très fréquente de l et r ou de k et de g (k en g, en règle générale) et de b et v.

(8) Analogie entre une forme de d basque, au son dr et le d (ou t) dit cérébral (dr) du Dravidien. Transformation en certains cas, de d médiane en r, en basque et en Dravidien (se rencontre aussi en Español, mais non en indo-européen, ni dans les langues du nord de l'Europe).

(9) Analogie du traitement des occlusives.

(10) Analogie dans le placement originaires des occlusives sourdes et des sonores.

(11) Position et nature similaire de l'accent tonique.

(12) Tendance analogue à l'harmonie vocalique.

(13) Tendance analogue à l'aspiration de certaines labiales initiales (par ex. p, en Drav., et. en Ibèr.).

(14) Particularités morphologiques. Structure polysynthétique analogue du Dravidien et du Basque.

(15) Construction semblable des mots par juxtaposition à une racine invariable, généralement mono ou disyllabique, de suffixes successifs.

(16) Formation analogue de mots composés à sens nouveau par simple juxtaposition de mots indépendants.

(17) Même formation du pluriel par l'intercalation entre la racine invariable et la désinence casuelle, d'une particule indicative du pluriel.

(18) Existence dans les deux groupes linguistiques de la forme particulière du génitif connue sous le nom de double génitif.

(19) Forme simple de la déclination d'un type unique en Dravidien, comme en Bosque. (Sans l'article défini postpositif).

(20) Absence commune d'une désinence spéciale pour le nominatif.

(21) Désinences analogues au datif et génitif singulier et pluriel, en Basque et en Dravidien.

(22) Absence originaire en Bosque et Dravidien, des genres, au pluriel. Forme unique pour le féminin et le masculin.

(23) Existence analogue de trois nombres, singulier, pluriel et indéfini ou collectif. (Sans le duel).

(24) Existence similaire d'un pluriel inclusif et d'un pluriel exclusif.

(25) Mêmes terminaisons du pluriel en Basque et dans divers parlers Dravidiens.

(26) Même manière périphrastique de former le comparatif et le superlatif.

(27) La particule *a*, signe de l'article défini postoposée en basque, employée comme article démonstratif en Dravidien.

(28) Analogies entre les articles démonstratifs basque et Dravidien (du singulier), et divers adverbes ou conjonctions (et, vers, la, etc.).

(29) Absence en Basque comme en Dravidien d'une forme pronominale spéciale pour la troisième personne, remplacée dans les deux langues par un démonstratifs dont le radical est le même.

(30) Analogies entre les articles démonstratifs Basques et Dravidiens et l'ancienne forme pronominale de la 3-e personne, aujourd'hui disparue.

(31) Indétermination originaire générale, en Basque et Dravidien des racines verbales, qui pourront être employées selon les cas, comme substantifs ou comme verbes.

(32) Conceptions, en général, passive et substantielle du verbe, en Basque et en Dravidien.

(33) Même formation de la conjugaison par adjonction au signe du temps de la terminaison pronominale.

(34) Prédominance des formes participales et gérondives.
(35) Infinitif équivalent primitivement à un substantif verbal.
(36) Invariabilité habituelle de la racine du verbe dans toutes les formes de la conjugaison.
(37) Ordre rigoureux analogue (surtout primitivement) de la phrase dû à l'indétermination des parties du discours et position du verbe en fin de phrase.
(38) Même utilisation de la désinence du génitif pour former des adjectifs.
(39) Même formation des substantifs abstraits par adjonction de suffixes analogues.
(40) Formation analogue des diminutifs à l'aide de particules souvent semblables, en Dravidien et en Basque.
(41) Même antériorité du substantif déterminant sur le déterminé.
(42) Ressemblances dans la formation, l'emploi ou la forme de divers collectifs, locatifs, ainsi que dans celle de l'auxiliaire "avoir" (ou être).
(43) Emploi de la particule -ka en Basque pour former des verbes; en Dravidien (Tamoul) pour former des infinitifs.
(44) Analogies entre certaines désinences pronominales des verbes et mêmes formes, anciennement, pour désigner les temps.
(45) Analogies dans la désignation et la construction de certains des noms des nombres cardinaux. (On peut observer qu'en ce qui a trait à la phonétique, le Castillan présente des caractères analogues, entr'autres, à ceux notés aux points 2, 3, 6, 7, 8, 9 et 13, legs évident du substrat linguistique)".

Page 242: "Quant au Basque, alors que l'on n'avait souligné jusqu'ici que sa paranté avec le Caucasien, et particulièrement le Caucasien du Nord, l'examen, même rapide, que nous en avons fait au point de vue phonétique, morphologique et très partiellement lexical, en le comparant au Dravidien, nous a amené à la conviction que le Basque se rapproche à peu près autant du groupe dravidien que du groupe caucasien. Il est même plus près du prémier que du second en ce qui a trait à sa phonétique, car celle-ci a chez le groupe caucasien, des caractères si particuliers que se dernier se distingue davantage à cet égard de tous les autres groupes, examinés par nous, que ceux-ci ne se distinguent entre eux".

Page 248: "Ces affinités que nous avons pu montrer entre le Dravidien, le Basque et les anciennes langues du sud de l'Europe rendent à ce qu'il nous semble caduque l'appelation "d'indo-européennes" pour les langues du nord de l'Europe et du nord de l'Inde, car les langues du midi de l'Europe et celles du sud de l'Inde, dont nous venons de voir les liens, constituent un groupe "indo-européen" qui devrait avoir par droit d'aînesse la priorité du nom".

28. Jorge Quintana Vives, Posibilidad de una Conexion entre las Formas Verbales Adjetivas de las Lenguas Dravidias y las del Sumerio, *Sefarad*, IV-2, pp. 245–254, Madrid, 1944.

The following summary from the relevant portions of this paper for which we are indebted to Father H. Heras, is interesting:

"On page 253 (the author deduces) his final conclusions referring to both languages, Dravidian and Sumerian:

(1) The verb is always at the end.
(2) In every phrase there is only one finite verb.
(3) Both have relative poverty in verbal tenses, which has been remedied in the languages of the Dravidian group in later times.
(4) Presence of a verbal adjective, i.e., the relative participle.
(5) Use of this form in lieu of the relative subordinate phrases (p. 254).
(6) Use of relative participle in the adverbial subordinate phrases, specially in the temporal ones.
(7) Lack of relative pronouns.
(8) Ditto, of subordinate conjunction.

(9) Use of relative participle of a substantive verb to put a substantive in attributive relation with another".

29. C. C. UHLENBECK, Indo-Germanic Mother Language and Mother Tribes Complex, *Amer can Anthropologist*, Vol. 39, 1937, pp. 385–93, especially pp. 390-91.

C. R. SANKARAN, in the first volume of the Bulletin of the Deccan College Research Institute, has discussed the onomotopoeic words for father and mother, which are frequently found to be homophonous in languages remote from one another, whether geographically or structurally. In such instances historical links may exist, but at the same time such forms are for the most part independent of one another. Where two or more different languages which, apart from what appears from their dictionaries, show intimate ties of former contact and have in common whole series of homophonous endearing words for various grades of kinship, we cannot reject the idea of a mutual genetic link between such onomotopoeic words without further consideration. SANKARAN's discussion here (BDCRI, Vol. I, p. 390–3), reminds UHLENBECK (*Taal en Leven*), Sept. 1941, p. 40) of consonances of endearing words in general and children's words in particular between Eskimo and PIE.

P. RIVET, Sumérien et Oceanien, *Collection Linguistique Publiée par la Société de Linguistique de Paris*, XXIV, Paris, 1929, pp. 41 and 46.

R. S. Vaidyanatha AYYAR, The Sumerio-Dravidian and the Hittite-Aryan Origin, Q. J. M. S., Vol. 10, 1929, pp. 334–5.

A wealth of ethno-psychological data is available in a number of papers whose object is to compare Indo-European with other families like Dravidian, Basque, Iberian, Altaian, Astroasian, Chinese, Greenlandish, Korean, Uralian, etc.; (Cf. *Festschrift f. H. Hirt*, 1936).

30. For further clarification on the concept of Ethno-psychology cf. :—"It cannot be taken for granted, that (all) words, which on account of their phonetic structure and the nature of their concepts may easily be associated with each other must on that account (alone) go back to a common source. They may not be related historically at all, and only appears so because they started from similar (not necessarily identical or historically connected) sources and underwent similar semantic development". (HILMER, The Origin and Growth of Language, *Journal of English and Germanic Philosophy*, Vol. 17, 1918, p. 24).

"In the measure that this growing capacity for analytical particularization tends to show correspondence in the psycho-lexical evolution of different peoples, both as regards ideas expressed and the order in which they have received expression, we may hope to ascertain more or less clearly those factors and forces of mental growth that are characteristic of mankind in general rather than of particular peoples.... The extent to which the growth of conceptual intelligence is governed by fundamental laws, principles or tendencies, is a question to which an ultimate solution will be found, if found at all, in the testimony of comparative lexicology. That such laws, principles or tendencies exist, and that they are no less constantly and fundamentally operative in the evolution of super-perceptual than of perceptual ideation, there seems little reason to question. The striking uniformity already observed in the mentality of primitive peoples, the fact now recognized by all evolutionists that all mental growth from the lowest to the highest levels is of unbroken continuity, the enormously long period that must have elapsed since the earliest manifestation of human speech, a period compared with which the date of our earliest records is but as yesterday, and, most of all, the inherent nature of the conceptual process itself, lend strong support to such a view...... In comparing the lexicological evolution of different peoples, therefore, we may expect to find correspondences both as regards the main types of conceptual classification and as regards the order in which these types have tended to receive expression; and upon the basis of such correspondences as are found to be most regular, frequent and general we may ultimately hope to determine more clearly those fundamental laws, principles, or tendencies

underlying the growth of conceptual intelligence in general". (J. T. CLARK, Lexicological Evolution and Conceptual Progress, *University of California Publications in Modern Philology*, Vol. 7, No. 4, Sept 21, 1918, pp. 185, 186, 188).

31. Jan CZEKANOWASKI, Na Marginesie Recenzji P. K. Moszynskiego o Ksiazce: Wstep do Historji Slowian (Marginal Criticism of P. K. MOSZYNSKI's *Introduction to the History of the Slavs*), Lud, Series II, Vol. VII, (1928).

32. KROEBER, A. L., and C. D. CHRETIEN: Quantitative Classification of Indo-European Languages, *Language*, Vol. 13, pp. 83–103.

33. KROEBER and CHRETIEN, *ibid*, believe that the random quality necessary has been achieved in their selection of the 74 elements, since KROEBER who originally selected the list, is not an Indo-European Linguist, but an anthropologist and American Indian Linguist who was choosing elements 'at random' in an unfamiliar field. We must protest with an emphatic 'no' to the assumption that such a belief is valid. For unfamiliarity has nothing to do with randomness. In such cases human bias is very much prevalent. "Trained observers may be biased even when conscious of their own imperfections...... We must look for true randomness elsewhere than in mere lack of purpose on the part of human observers". There are standardised methods of doing it. Cf. M. G. KENDALL, *The Advanced Theory of Statistics*, Vol. I, p. 190 ff.

Moreover, the succeeding pages reveal that 18 out of 41 of our coefficients (of course all based upon KROEBER-CHRETIEN data) have significant X^2 values, which might very well mean rejection of the hypothesis under consideration, viz.. the degrees of similarity between groups of languages (like Italo-Celtic, Slavic-Baltic and Iranian-Sanskrit) in those 18 cases. Hence *a fortiori* KROEBRR-CHRETIEN coefficients may not agree with non-statistical judgments in all cases. (Cf. G. W. SNEDECOR, *Statistical Methods*, pp. 22–23). Cf. also foot-note 46.

34. A. L. KROEBER and C. D. CHRETIEN, Quantitative Classification of Indo-European Languages, *Language*, Vol. XIII, p. 88.

35. C. D. CHRETIEN, The Quantitative Method for Determining Linguistic Relationships, *University of California Publications in Linguistics*, Vol. I, pp. 19 ff.

36. This list will be forbiddingly high needing to be culled out from such works as the following: BRUGMANN, *Comparative Grammar of the Indo-European Languages*, Vols. I to IV, MEILLET, Introduction à l'Etude Comparative des Langues Indo-Européennes; Les Dialectes Indo-Européens, etc.; H. PEDERSON, Hittitisch und die Anderen Indo-Europäischen Sprachen; Tocharisch, etc.

37. C. D. CHRETIEN, *Ibid.*, Especially p. 17 ff.

38. SAPIR, Sound Patterns in Language, *Language*, Vol. I, pp. 37–52. Franz BOAS, *Race, Language and Culture*, and see also, Franz BOAS, Classification of American Indian Languages, *Language*, Vol. 5, p. 3.

It is clear that we mean not merely genetic relationship but any other kind of relationship that may arise (due to the languages being spoken in two contiguous areas), such as the borrowal of morphological features [as for instance the influence of the Dravidian participial construction on the Indo-Aryan (J. CANEDO, Sobre las Influencias Dravidias en las Lenguas Aryas de la India, *Emerita*, VIII–IX, Madrid, 1940–41; J. Quintana VIVES, Possibilidad de una Connexion entre las Formas Verbales Adjectivas de las Lenguas Dravidias y las del Sumerio, *Seferad*, Madrid, 1944, Vol. IV, pp. 245 and 246)] which will establish a relation between these two sets of spoken dialects.

39. SAPIR, Sound Patterns in Language, *Language*, Vol. I, p. 40.

40. A. L. KROEBER and C. D. CHRETIEN; Quantitative Classification of Indo-European Languages, *Language*, Vol. XIII, p. 93.

41. A. L. KROEBER and C. D. CHRETIEN, *ibid.*, *Language*, Vol. XIII, pp. 94–95. Cf. the following extract from their paper:

"We have marked a number of entries in the tabulation as (+) and (-). The ordinary plus and minus indicate that the statement of the element is universally true or not true. When enclosed in parenthesis they indicate that the statement is generally but not universally true or not true. We have counted (+) as + and (-) as -. The question mark indicates that information is lacking, and the entry omitted from computation."

42. A. L. KROEBER and C. D. CHRETIEN, Quantitative Classification of Indo-European Languages, *Language*, Vol. XIII, p. 83.

43. C. D. CHRETIEN, The Quantitative Method for Determining Linguistic Relationships, *University of California Publication in Linguistics*, Vol. I, p. 16.

44. For the definition of 'Speech Community' see L. BLOOMFIELD, Linguistic Aspects of Science, *International Encyclopedia of Unified Science*, Vol. I, No. 4, The University of Chicago Press, Illinois, 1939, pp. 15-16. Cf. also BLOOMFIELD, *Language*, Ch. 3, pp. 42-56.

45. For instance an Indo-Aryan dialect like Marāṭhi has come under the influence of Dravidian (Cf. Jules BLOCH, La Formation de la Langue Marathe, Paris, 1919, p. 243) participial construction but it will certainly show dissociation with a language like Tamil (in any of its dialectal forms) which is distantly separated both in time and space and which, according to the accepted methodology of the comparative method, belongs to yet another family (omitting considerations of primeval relationships).

46. Cf. A. MEILLET, *Les Dialectes Indo-Européens*, Paris, 1922, p. 7:

"L'identité presque complète de la structure morphologique des deux dialectes (Indian and Iranian) avait pour conséquence naturelle l'identité des innovations".

Cf. our two graphs for Sanskrit and Iranian. They have almost the same relationship with the remaining languages, especially in morphology.

The Balto-Slavic relationship is even closer than the Indo-Iranian relationship especially with respect to phonology. (MEILLET, *Dilectes*, etc., p. 40-43).

Cf. MEILLET, *Dialèctes*, pp. 40-41 :

"Le baltique et le slave présentent ce trait commun de n'avoir subi, au cours de leur développement, aucune fracture brusque du système...... La structure phonétique a gardé son aspect d'ensemble; même les consonnes intervocaliques qui, presque partout ailleurs, ont été plus ou moins altérées sont restées à peu près intactes à la fois en baltique et à slave".

Whereas, for example, "L'indo-iranien a confondu les timbres de *e* et de *o*, et brouille ainsi toute une partie des alternances vocaliques employées en morphologie".

Further more (p. 48) :

"On conclura que le baltique et le slave ont en des points de départ exactement identiques, qu'ils se sont développés dans les mêmes conditions et sous les même influences".

As already pointed out in foot-note 33, 18 out of 41 coefficients based on KROEBER-CHRETIEN data have significant X^2 values, which might very well mean rejection of the hypothesis, viz., the degrees of similarity between groups of languages (like Italo-Celtic, Slav-Baltic and Iranian-Sanskrit) in those 18 cases.

47. According to KROEBER and CHRETIEN Armenian and Germanic are almost independent of each other. But our result shows that, morphologically, they are strongly under alien influences.

Cf. in this connection A. MEILLET, *Les Dialectes Indo-Européens*, p. 92 :

"La concordance des faits arméniens et germaniques est complète, et il est très tentant d'en reporter le point de départ à une innovation dialectale de date indo-européenne, les premières objections qui se présentent tout d'abord se laissant lever à la rigueur.

L'arménien et le germanique sont parlés en des regions assez éloignées, au moment où l'un et l'autre apparaissent dans l'histoire; mais l'arménien a sûrement été transporté loin de son centre d'origine et a pris la place d'une langue antérieure tout autre......... (p. 96) Il convient donc sans doute de separer les faits arméniens des faits germaniques : les possibilités phonétiques sont en nombre très limité, et la réalisation d'une même possibilité dans deux langues indo-européennes ne suffit pas à autoriser l'hypothèse d'un rapprochement dialectal à l'intérieur de l'indo-européen. L'arménien et le germanique appartiennent du reste à des groupes assez différents et ne présentent aucune autre particularité qui ne serait propre qu'à ces deux langues. Il y a entre les deux des resemblances de structure assez frappantes, mais qui tiennent à des développements indépendants...... De pareils parallélismes de développement n'établissent pas une parenté dialectale".

48. R. A. Fisher, *Statistical Methods for Research Workers*, 1944, p. 80 and also p. 85.

Also see, R. M. S. Heffner, Notes on the Length of Vowels, *American Speech*, Vol. XVII, p. 45. Cf. especially the following passage :

"Almost any set of numbers, if compared with any other set, will show some kind of coefficient of correlation; the problem is to interpret this coefficient in our own study, first as to its probable significance or lack of significance, and second as to what relationship causes the correlation. In some fields, for instance in Psychology and in Education, it would be customary to require a coefficient of at least 0.40 if the sample measured has 40 items, or 0.42 if the sample has 30 items, before a significant relationship would be inferred. It doesn't follow from this that we must have coefficients of this order before we may infer a significant relationship, nor does it follow that a coefficient even of 0.50 must, of necessity, indicate some interdependence of the two factors. We have here no precedence to guide us, and must be guided in our interpretation of r by what we can learn otherwise from our data."

49. R. A. Fisher, *Statistical Methods for Research Workers*, Oliver and Boyd Ltd., 1944, pp. 92–94.

50. Some of the important corrections made by Kroeber and Chretien to their coefficients are indicated by isolated points on the graphs. See *Language*, Vol. 14, p. 289, Miscellanea-corrections.

Our graphs have the advantage over the Kroeber-Chretien block diagram, which gives directly an idea of the situation, in that these graphs of ours show in greater detail the relationships under discussion.

51. Cf. A. Meillet, *Les Dialectes Indo-Européens*, pp. 131–133.

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REVIEW

Tolkāppiyam—Porulatikāram by E. S. Varadaraja IYER, Vol. I, Part I, pp. xiv + pp. 1–206; Part II, pp. 207–584, Annamalai University Tamil Series, No. 9, Published by the Annamalai University, Annamalai Nagar, 1948.

Akattiṇai Iyal and *Kaḷaviyal* (Part I) and *Kaṟpiyal* and *Poruḷiyal* (Part II), translated into English. Forewords by Mr. M. RUTHNASAMY and Dr. A. Chidambaranatha CHETTIAR.

In this work, Śri. E. S. Varadaraja IYER has translated four chapters from *Porulatikāram* of *Tolkāppiyam*. *Akattiṇai* and *Kaḷavu* form the first part while *Kaṟpu* and *Poruḷ* constitute the second part.

Both the earlier commentators, *Iḷampūraṇar* and *Nacciṉārkkiṉiyar*, were separated from *Tolkāppiyar* by about fifteen centuries. Navalar S. S. BHARATIYAR, who published his commentary in Tamil in 1942, has strikingly re-evaluated *Tolkāppiyam*. As A. C. CHETTIAR observes, Śri. E. S. Varadaraja IYER's omission of the opinion of S. S. NAVALAR in regard to Sūtras 29, 31 and 34 (pp. 43–48) is really serious (Foreword p. ix).

It is commendable that E. S. Varadaraja Iyer mostly leaves the reader to interpret for himself to the best of his light from the available data in the commentaries of *Iḷampūraṇar* and *Nacciṉārkkiṉiyar*, as for instance, see sūtra 146, (p. 237). Śri. E. S. Varadaraja IYER is also responsible for liberal and commendable interpretations of certain expressions and ideals (see sūtra 94, pp. 87–88 and sūtra 145, p. 235). One meets, in this translation, with additional short studies on kingship (sūtra 20, pp. 10–31), clandestine love (pp. 82–85) and courtezans (pp. 361–365; Cf. A. C. CHETTIAR, *ibid.*). In connection with the last passage, Śri. Varadaraja IYER quotes the views of Sir James G. FRAZER on religious prostitution and also ALTEKAR's views on the association of dancing girls with temples (pp. 364–365). The translator's rendering of several verses from the old Sangam literature are enjoyable.

I agree with A. C. CHETTIAR that the sūtras 21–26 of *Akattiṇai* should have been given in their proper places (see pp. 35–39; cf. A. C. CHETTIAR, *ibid.*, x). The reader is referred to pp. 207 ff., for the entire text of this chapter.

In his preface (p. xiii), Śri. E. S. Varadaraja IYER says, "The sutrams have been given with their transliteration in English". But one is disappointed with the omission of Roman transliteration in the first part of the work. Only in the second part, we meet with the Roman transliteration. The omission of the Roman transliteration in this way is a serious one in this work, as the book under review should in the very nature of things be useful to those who do not have a first-

hand acquaintance either with the language or with the script. Again, the absence of Tamil spellings for the main titles *Akattiṇai Iyal*, *Kaḷaviyal*, *Kaṟpiyal*, *Poruḷiyal*, and the absence of proper diacritical marks in the Roman transliteration for these terms, is glaring. To write *Agattiṇai* while denoting this speech-form of Old Tamil is misleading. It should be written simply *Akattiṇai* (Cf. C. R. SANKARAN and A. C. SEKHAR, Middle Dravidian Morphology, BDCRI, Vol. 6, 1945, p. 159).

This work has to be thus improved upon in many ways. Nevertheless, Śri. E. S. Varadaraja IYER has placed the Tamil loving scholars under a deep debt of gratitude and the Annamalai University deserves our congratulations for bringing out such a valuable work as this.

It is the conviction of the reviewer of this work that *Tolkappiyam-Poruḷatikāram* should be re-evaluated in the light of the ambitious programme of the General Semanticists. The fundamental assumption of Western civilization is a product of the cultural evolution which exaggerated the social atomism of the human self. "Now we witness the breakdown of old semantics. The traditional values and evaluations are on the way out...... From the Korzybskian point of view, the difficulties that confront our civilization arise in large measure from the fact that socially we are still functioning in the second stage, in accordance with the time-honored though now outworn and obsolete principles of orientation ('laws of thought' etc.): and that to run a large and socially intricate society, we need to get beyond the social un-sanity of these verbal fictions, elementalistic formulations, confusions of various orders of abstractions, etc., which have now become completely inadequate in a universe of dynamic processes and non-elimentalistic 'realities'. If the depressing crescendo continues to move unchecked, and unabated, the world will continue on the road to semantic suicide." (Cf. Oliver L. REISER, Historical-Cultural Significance of Non-Aristotelian Movement and the Methodological Contributions of Korzybski, *Papers from the II American Congress on General Semantics*, University of Denver, August, 1941, Non-Aristotelian Methodology (applied) for Sanity in our Time, Compiled and edited by M. KENDIG, Institute of General Semantics, Chicago, 1943, p. 5).

Poruḷatikāram, the third division in the apparently oldest grammatical work in Tamil, *Tolkāppiyam*, is paradoxically speaking, really a contribution towards the modern science of General Semantics. The reviewer is confident that Śri. Varadaraja IYER's present work will go a long way towards further contributions from Tamil scholars, especially from the point of view of the growing science of General Semantics, re-evaluating *Tolkāppiyam Poruḷatikāram*.

C. R. SANKARAN

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